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THE
DIARY COMPANION;
BEING A
SUPPLEMENT
TO THE
LADIES' DIARY,
FOR THE YEAR 1801.

Containing Answers to the last Year's ENIGMAS, REBUSES, CHARADES, QUERIES, and QUESTIONS; both in the DIARY and SUPPLEMENT.

With some New ENIGMAS, REBUSES, CHARADES, QUERIES, and QUESTIONS, proposed to be answered next Year.

Also, CALCULATIONS of the ECLIPSES; and other New Discoveries in the Heavens.

By the DIARY AUTHOR.

LONDON:

Printed by W. GLENDINNING, No. 25,
HATTON-GARDEN;

For G. G. and J. ROBINSON,
Paternoster-row.

[PRICE TWELVE-PENCE, STITCHED.]

S U P P L E M E N T
TO THE
L A D I E S ' D I A R Y,
FOR THE YEAR 1801.

A N S W E R S T O T H E E N I G M A S.

<i>In the Diary.</i>		<i>In the Supplement.</i>
1 Air	6 Buckles	1 Words
2 Silence	7 Devil	2 Glass
3 Nipple	8 Snow	3 Nose
4 Cock	9 Dischclout	4 Guinea
5 Snuffers	10 or Pr. New Yr's. Day.	5 Cloud
		6 Truth
		7 Thistle
		8 or Pr. Fan.

Other Answers to the Diary Prize Enigma, beside those inserted in the Diary, are as below:

8. *Some Hints on the Old Bachelor's Dream, last Year: by Anonymous.*

Can the votaries of Hymen be silent and hear
A tale that's depicted like Rimmer's, last year?
No, myself by experience with pleasure can show,
That woman was sent as a blessing below.—
I would not offend, yet it needs some enquiry,
How this Dream found a place in your far famed Diary.
He awoke with a shock! but it clear is to me,
That the gent. in the night must delirious be.
Tho' I wish not to dictate, yet trust that he may
To the ladies apologize next *New Year's Day.*

9. *To the New Year's Day: by Junius Barren.*

Now nineteen times the feeble ray
Hath gleam'd upon my lonely way;
I backward turn, while memory's beam
Paints the past years a gloomy dream:
Hope spread before my infant eyes
Her magic powers, her scenes arise;
Her scenes of joy before me smil'd,
Where fancy rock'd her fav'rite child:
Soon reason's dawn expelled the shade,
Those fleeting scenes that fancy made;
Her powers creative charm no more,
And fancy plagues who pleas'd before.
In vain would resignation's powers
Call hope to cheer my gloomy hours.
Rejected hope her charm denies,
One gloomy void before me lies.
Hail then, once more, returning *New Year's Day,*
I view thy cheerless face, and feel thy potent sway.

No. 14. Diary Prize Enigma answered. 3

10. Address to Mr. Smart: by Mr. J. Brookshank, Leicester-Sq. London.

Dear Smart, all hail! thou first of Dia's train!

"Accept the wish, nor may the wish be vain";

May you with roseate health long blessed be,

And may you—happy—many *New Years* see,

11. On Winter: by Constantia.

"No more the muse attunes the Doric lay,

"To chaunt the beauties of a vernal day;

"No longer, led by rapt'ring fancy, roves

"O'er flower-deck'd plains, or thro' the vocal groves;

"Far diff'rent scenes, and lonelier views she sings,

"And strikes with plaintive tones the trembling strings;

"Scenes, where no vivid tints of beauty glow,

"But clouds and darkness close the dreary show."

In mournful accents thus began the swain,

The sweetest warbler of Diaria's train;

In pomp unusual paints the awful scene,

The leafless forest, the deserted green;

Dismantled groves in sad perspective rise,

And unrelenting tempests rend the skies;

On every line the muses drop a tear,

And weeping graces mourn th' expiring year.

Yet strains like his Diarian breasts can warm,

And, drawn by him, the wintry landscape charm;

The cheerless glooms, which brumal seasons bring,

Are but the prelude to returning spring;

Thro' the dark veil celestial Hope descries

Revolving summers, and serener skies;

Beset with sorrows, thus the wise shall find

The certain solace of a virtuous mind.

Sweet balmy Hope shall every grief assuage,

And sooth the anguish of forsaken age:

'Tis thus, by Hope, midst frozen scenes we are gay,

And hail with rapture every *New Year's Day*.

12. Invocation to Peace: by Mr. Wm. Francis, Jun.

Return, sweet Peace, may Britons once again

Enjoy the blessings thou alone can give:

With Plenty, smiling mid thy joyful train,

Teach us in thee contentedly to live.

Thrice happy then each *New Year's Day* we'll hail,

Her ample horn enlivening ev'ry breast;

Whilst Mirth and Love and Friendship shall prevail,

And all with white-rob'd Innocence be blest.

13. Address to Mrs. Blanch Lean: by Mr. Rob. Richardson.

Rous'd by thy well-known name, my bosom rose,

Dear to the spirit of Diarian flame!

And, joyous, greets thee, from thy long repose.

To rise again and twine with mine, thy name.

Together, let us, (witch and wizard) go
 Along the flow'ry paths, we, erewhile, trod ;
 Creating, as the streams of magic flow,
 Conundrums, Luggs, and Laceys at our nod.
 (Dear names ! long lost !—oft, o'er our vernal hours,
 They pour'd the honey'd balm that thrills the heart :
 How did we revel in our distant bow'rs,
 In fancied interviews, whole worlds apart !)
 Lend thy white arm to lift the magic wand ;
 Bid Taunton, Bridport, all Diaria, shake ;
 Till, like Ithuriel's spear, our mutual hand,
 Rends fancied graves, and bids our brethren wake.
 Then, with the charm thy angel-voice can give,
 Sooth the new tumult ; and—sweet-smiling, say,
 " Bid love, bid poesy, bid music live,"
 And hail, again, *Diaria's natal day*.

14. *The Wish: by Mr. Alex. Rose, of Reginnis.*
 " Diarian friends, a lov'd, an honour'd, train,
 Accept the wish, nor may the wish be vain ;
 May grief not vex, or cank'ring" cares allay
 The joys arising from the *New Year's Day* ;
 " With sweet reflection temper o'er the past,
 And taste each visit sweeter than the last.

15. *Composed on New Year's Day: by Mr. John Savage.*
 Nature, in vest of innocence array'd,
 On *New Year's Day* for eighteen hundred see ;
 Another century now is almost fled,
 " With the years beyond the flood" it soon will be.
 How many thousand souls since the last year,
 By death and war are summon'd to the skies,
 Before the judgment-seat—and still I fear,
 There's still impending fresh calamities.
 Thou great tremendous God, with pitying eye,
 Look down on this distressed sinful land,
 Send down the meek-eyed virgin from the sky,
 To stretch o'er every realm her olive wand.

16. *By Mr. John Tindale, London.*
 Could I, like Smart, in dulcet strains excell,
 Each *New Year's* prize with ease I'd tell ;
 With magic sweetness wou'd I tune my lays,
 And fill the woodlands with *Diaria's* praise.

17. *By Mr. Henry Tonson, of Loughborough.*
 The prize enigma did, this year,
 With strange ideas store me,
 I thought at first there did appear
 A winter's work before me.

No. 14. Diary Prize Enig. answered.

5

But turning o'er the leaf, my mind
Spurn'd such loose thoughts away ;
For there the wond'rous works confin'd
To one short *New Year's Day*.

18. On *Lady Di*: by Miss Emma Vernon, Liverpool.

How sweetly glide the moments by,
When occupied with *Lady Di* ;
Fresh beauties still in every page,
Our fond attention must engage ;
With *New Year's* odes, and sonnets sweet,
And mathematics too replete ;
True wit and science here combin'd,
Enrich at once and please the mind.

GENERAL ANSWERS TO THE DIARY ENIGMAS.

13. *New Year's Feast*: by Mr. P. Barlow, of Norwich.

'Twas last *New Year's Day*, some sparks blith and gay, 10

Met to drown all their cares in a bowl ;

There was punch, smoaking hot, and the Devil knows what, 7

And delighted seem'd each honest soul.

With a pipe and a song, the night, though so long,

Pass'd away like a bubble of Air ; 1

Each, with a full glass, toast his friend and his lass,

And wish'd them a happy new year.

The nectar, as sweet as the child thinks the Teat, 3

We all drank like fish in the river ;

There was Silence profound, till the toast had been round, 2

King George and old England for ever.

Then bring t'other bowl, cries a thirsty old soul,

And a Cloth, just to wipe down the table ; 9

The Snuffers laid by, a good light to supply ; 5

We drank long as e'er we were able.

Till the Cock in the morning, of day light gave warning, 4

Which said it was time to depart ;

Then thro' wind and Snow, each homeward did go, 8

And buckled his friend to his heart. 6

14. *The same*: by Mr. H. Codling, Schoolmaster, Ranworth.

Now *New Year's Day* some moons we've past, 10

The Nipping rage of Snowy blast ; 3, 9, 8

Your lights and Snuffers leave in rear, 5

Like Buckles, useless out of wear, 6

And Silence seek in open Air. 2, 1

When Sol to Thetis's bed descend,

And Cocks and hens to roost ascend, 4

And shadowy night presents her shapes,

Of Devilish spirits to silly apes, 7

Then hill or dale my steps invite,

To draw the infant breath of night.

15. *A Jaunt to Studley-Park: by the Rev. J. Ewbank, Vicar of Thornton.*

When the *Snow* was all gone, and the fields clad in green, 8
 With the hedges in bloom, made a beautiful scene,
 I mounted my horse, and for Studley straight rode ;
 Thro' Ripon I pass'd, but made there small abode.
 Spurs, *Buckles*, *Cocks*, *Snuffers*, exposed here you see 6, 4, 5
 For sale ; but such trinkets no charms had for me.
 On Alderman Stevenson I gave a call,
 Who shew'd me the Minster, and eke the Town-hall.
 At his invitation I with him drank tea ;
 And then I proceeded fam'd Studley to see.
 At the house where I slept you behold the Green-man,
 In *Silence* inviting such guests as he can. 2
 Of beds, and clean *linen*, good meat, and good drink, 9
 If you call, he will not disappoint you, I think.
 As the ev'ning was fine, and the *Air* was serene, 1
 I walk'd till the Abbey of Fountains was seen ;
 And when I was there, I went forward to call
 On a quondam acquaintance, who lives at the Hall ;
 Who, according to promise, soon met me next day,
 And shew'd all the beauties the scene could display.
 The daughter, exposing her *Nipples* to feed 3 }
 Her aged poor father, is pious indeed ! }
 To describe all the rest wou'd my limits exceed, }
 As in Eden of old, here's no *serpent* to fear 7
 The place is delightful ! Adieu till next year. 10

16. *The same answered; by Mr. John Fildes, Liverpool.*

By your permission, Lady Di,
 To solve th' enigmas here I'll try.
Cock, *New Year's Day*, with *Air* and *Snow*, 4, 10, 1, 8
 And *Silence*, five will clearly show ; 2
 Next, *Snuffers*, *Buckles*, and a *Clout*, 5, 6, 2
 I think will make three others out ;
 Next come the *Devil* and a *Teat*, 7, 3
 To make my answers quite complete.

17. *The same: by Jacobus of Norwich: in lines addressed to Jacob J. of Norwich, who asserts that he is the Author and Contributor of the Trifles inserted in the Diary by Jacobus.*

Jacob ! thou'st found a very easy clue,
 'T' unrevel mysteries ; 'tis worthy you,
 And you alone to claim another's name,
 Another's labours ;—sure you're not to blame ;
 Since 'tis so very easy to assert,
 That at plain guessing you are quite expert ;
 And as to rhymes, you long had been a poet,
 Tho' none besides yourself did ever know it.

No. 14. Diary Enigmas answered.

7

Trifles they are, yet thy capacious brain	
Attempts to solve the <i>Silent</i> thought in vain.	2
For wrapp'd in tenfold darkness from thy view,	
Is each charade, enig. and rebus too.—	
To set thee free then from this puzzling chain,	
On <i>New Year's Day</i> the mysteries I'll explain ;	10
Unbuckle all their bandages, and shew	6
(In open <i>Air</i> before the <i>Cock</i> has crew)	1, 4
The <i>Treat</i> therein contained ;—than <i>Snow</i> more clear,	3, 8
On glass clean <i>wip'd</i> , each riddle will appear :	9
Or, if at eve you <i>Snuff</i> the light, one minute	5
Will shew you all, or else the <i>Devil's</i> in it.	7

18. Spring : by Mr. John Savage, of Green's Norton.

Now gentle winds waft thro' the lenient <i>Air</i> ,	1
No more the birds sit <i>Silent</i> on the spray ;	2
Again the dews on nature's lap appear,	3
Soon as the <i>Cock</i> proclaims the rising day.	4
Now lengthen'd days the <i>Snuffers</i> useless make,	5
E'en as gay fashion does the <i>Buckles</i> aid,	6
While <i>lively</i> green the groves and valleys deck,	7
That late the <i>Snow</i> in bright confusion laid.	8
Thoughtless of <i>Dishclout</i> now the amorous pair,	9
At parting <i>day</i> walk forth t'unbend their care.	10

19. Susan's Fright : by Timbertoe.

Her master and mistress had retired up stairs,	1
And Susan was left to arrange all the chairs ;	
So <i>Sniff'd</i> out the lamp, and unbuckled her shoes,	5, 6
Then in <i>Silence</i> prepared to follow her nose.	2
On a nail 'hind the door, the <i>Dishclout</i> was hung,	9
Which awkwardly op'ning, full in her face swung ;	
Thence dropp'd on her <i>breast</i> , e'en as cold as the snow ;	3, 8
And just at the time <i>Chanticlear</i> 'gan to crow.	4
Poor Susan now thought that the <i>Devil</i> was come,	7
And falling full length, awaited her doom ;	
But her mistress, who heard the noise of her fall,	
Soon brought her to life, and her senses with all ;	
The whole being explain'd, she went up to bed,	
But still her late fright ran too much in her head.	
No sleep cou'd she get, and dawn 'gan to appear,	
When Susan remember'd it was the <i>New Year</i> ;	10
What past is, and done, she said, cannot be mended,	
The new may bring luck, if th' old hath ill ended,	
So arousing herself, in haste she prepares	
To follow the daily routine of affairs.	

ANSWERS TO THE SUPPLEMENT PRIZE ENIGMA.

Junius Barren's Address to a Lady who squinted intolerably, and whom he kissed whilst asleep.

What sweet delirium fill'd my throbbing breast,
What raptur'd Fancy when thy lips I press'd :
But lo ! awake when thou thy lover eyed,
Those short-lived embers in my bosom died.

Strange, when oblivion wraps thy sleeping frame,
Within my breast shou'd live the amorous flame ;
But when awake, life beaming from thy eyes,
That tender passion in oblivion dies.

2. *To Louisa : by Mr. John Fildes, Liverpool.*

Louisa, I think that on me you're too warm ;
To Emma's fair fame I ne'er meant the least harm :
And you may believe me I am a young man,
Who wou'd not hurt even a bone in your Fan.
But wish, as before, she may soon be a wife,
And taste the pure sweets of a conjugal life ;
A wish which I think ev'ry maid must approve,
Who ever has felt the soft power of love.

3. *The same : by Mr. Wm. Francis, Jun. Bath House Academy, Hampstead.*

When love's warm passion glow's in Chloe's cheek,
Quick to her Fan applies the blushing lass :
What better veil wou'd any wish to seek,
For Cupid's flame, or from the beau's rude glass.

4. *To Miss Amelia Addison : by Mr. Edmund Gill.*

Whisp'ring love to his fair one, how happy the man,
When she blushes consent half conceal'd by her Fan.—
But if thou wert the Fair whom his passion shou'd move,
And I the blest youth whom thy heart could approve ;
Oh how would the blush of Amelia inspire,
And Fan the young flame rais'd by love's tender fire ;
That sweet blush of beauty, by modesty drest,
Where the eyes beam the virtues that dwell in the breast ;
And still found with innocence, friendship, and ease,
Fair happiness reigns in the bosom of peace.

5. *By Mr. David Lewis, Knaresborough.*

I wonder, Sir, howe'er you can,
At this cold season prize a Fan.
Here in the north we none require,
But to clean corn, or blow the fire.

6. *On the Death of an Intimate Friend : by Miss A. W. Makon.*

How aptly call'd the " vale of tears ",
Alas ! this earthly state appears !

No. 14. Supp. Prize Enig. answered. 9

Illusive Fancy strives in vain
T' outstretch the bounds of grief and pain!
Could friendship's voice by death be heard,
Or truth and virtue meet regard,
To me Eliza had been spar'd:
But ah! the stroke we can't evade;
'Tis nature's debt, and must be paid!

7. Cupid superior to Mars: by Mr. H. W. Mapre.

No more let conq'ring heroes boast
The prowess of their mighty host,
When war uplifts the shield:
One envied pat from Myra's Fan.
By love shall disconcert their plan,
And bid the bravest yield.

2. The same: by Mr. Alex. Rowe, Reginnis, Cornwall.

" In Delia's hand the Fan is fatal found,
Nor could that fabled dart more surely wound.
Both gifts destructive to the giver prove,
Alike both lovers fall by those they love." POPE.

9. The same: by Mr. Rob. Sanderson, Coventry.

Ladies no more your smiles deal out
To that rude creature, man:
He made the gentle Flavia pout,
And (monstrous!) tear her Fan.

10. To Miss Eliza Still: by Mr. T. R. Smart.

For the laurel bestow'd, which with honor I wear,
Accept my best thanks, my accomplished fair;
Nor need you to hide your sweet face with your Fan,
When I wish you, for partner, a suitable man;
Blest with wit and good humour, of honor approv'd,
Who can love you as merit like yours should be lov'd.

11. The Seasons: by Miss A. T. Tabernacle Walk.

Seethe trees and herbage springing, Now behold the farmer smiling,
Phœbus whips his fiery steeds; Golden ears in sheaves are bound;
Hear the feather'd tribe a singing, From morn to eve the lab'rertoiling,
Gently on to summer leads. Gleaners gladly clear the ground.
Now with flowers fit for wreathing, Now loud Boreas fiercely blowing,
The sweet parterre does abound; Herbage to appearance dies;
Softest zephyrs gently breathing, Chilling frosts, with frequent snow-
Fan the gay perfumes around. Nature in oblivion lies. [ing,

12. Address to Louisa, occasioned by her Answer to Emma's Wish: by Miss Emma Vernon, Liverpool.

Why shou'd Louisa's tender heart The swain who bends beneath your
With such emotions glow, [frown,
And prompt her thus to take my Deserves your warmest praise;
Against a Fancied foe. [part, His worth and parts have gain'd a
Of never-fading bays. [crown

13. *The same: by Mr. Poussin Walker, Nottingham.*

Diarian muse, whose learned page, How oft with anxious care I try'd,
 Oft I with rapture have explor'd; Thy dark enigma to unfold;
 Ingenious minds thou dost engage, When lo a sage Diarian cry'd,
 Their merits faithfully record. Five crowns, it is a *Fan*, I'll hold.

Various other separate and ingenious answers to the Prize Enigma were also given by the following ladies and gentlemen, viz. John Ashcroft, Atalanta, Eliza Banbury, Charlotte Beetham, John Brooksbank, W. Buttermann, Tho. Crosby, Peter S. Dale, R. Dutton, J. Ewbank, J. Fildes, Rebekah Ford, Wm. Fox, Mrs. Furnass, Barn. Harrison, S. Helford, Jos. Hindson, Wilos Hostman, J. Lockwood, Eliza Maggs, Tho. Nield, Parthenia, Benj. Richardson, John Savage, Rd. Savage, John Scholfield, Ja. Sparrow, Ja. Thoubren, John Tindale, John Williamson, &c.

GENERAL ANSWERS TO THE SUPPLEMENT ENIGMAS.

1. *Dame Fortune's Address to Mr. Rob. Sanderson: by Atalanta.*

Why wonder, Sanderson, to find,
 That I to you have once been kind,
 In spite of mad opinion;
 Tho' all my favorites are fools,
 Has been a *Truth* long held in schools,
 Thro' every dominion.
 But when true worth like thine appears,
 I forfeit should, *Fan*, *Nose*, and ears,
 Still to neglect such merit;
 I weigh the influence of all hearts,
 And I can judge of brilliant parts,
 Wherever they inherit.
 Therefore go on, my favourite bard,
 Thy labours still shall meet reward,
 While I preside as donor:
 On *Glass*, *Cloud*, *Thistle* tune thy lyre,
 High let thy *golden Words* aspire,
 Thy works I'll ever honor.

2, 5, 7
4, 12. *A Rural Excursion: by Mr. W. Buttermann.*

When cold winter's tempests no more I espy,
 O'er Derbyshire's mountains I frequently hie,
 To view the earth's treasures, and taste of such sweets,
 As only reside in those rural retreats;
 Tho' irksome the task, I with pleasure descend,
 The mine's awful depths, when in co. with a friend.
 If dangers appear, I can smile at the sight,
 For wild nature I view with a sacred delight—
 Tho' sometimes I creep with my *Nose** in the mire,
 It only rekindles that ardent desire,

* This is literally the case in viewing the mines in general.

No. 14. Supp. Enigmas answered.

11

Which ev'r attends on excursions like these,
Pursue the gay prospects what manner we please ;
The ruby bright lustre that tinges the sky,
Can't equal the unclouded beauties we spy ; 5
With *Truth* I may add, that ev'n *Guinea's* fam'd coast, 6, 4
Tho' richer, can such a variety boast.
Hence leave those fam'd caverns of nature and art.
One moment's attention to mountains impart ?
Fatigu'd when the rock's awful summit I gain,
Scratch'd o'er with sharp *Thistles*, and smarting with pain, 7
Words cannot express my emotions of mind, 1
Till *Fann'd* by fresh breezes new vigour I find ; 8
Half rais'd with my *Glass*, and my knee on the ground, 2
I view the rich prospects presented around ;
How noble the scene ! nay how awfully grand,
Is a landscape design'd by nature's rude hand !
Tho' rough, and uneven, the windings we trace,
Each object appears with a dignif'd grace.

3. A Caution: by Mr. J. Fildes, Liverpool.

If too many <i>Guineas</i> you spend o'er the <i>Glass</i> ,	4, 2
You'll surely ere long be as dull as an ass,	
That feeds upon <i>Thistles</i> , dry straw, or what not,	7
Your <i>Nose</i> too will shew you to be but a sot.	3
Your <i>Fancy</i> will soon become <i>Clouded</i> forsooth,	8, 5
And even your <i>Words</i> will be thought void of <i>Truth</i> .	1, 6

4. The same answered: by Mrs. Furness, of Ponteland.

<i>Words</i> , <i>Glass</i> , and <i>Nose</i> , with <i>Guinea</i> new,	1, 2, 3, 4
A <i>Cloud</i> , and evidence more <i>True</i> ,	5, 6
Will six enigs. explain ;	
A <i>Thistle</i> , grow it where it may,	7
And <i>Fan</i> , that coolest the hottest day,	8
Complete the whole, 'tis plain.	

5. The Lover's Lamentation: by Mr. Wilos Hostman, Newcastle.

Ah! why am I thus doom'd to woe ! With what fond pleasure have I drest	
To live a painful life below,	
Unnotic'd and unseen ?	
Had I been hurri'd to my tomb,	
That day I left my mother's womb,	
" These ills had never been."	
Yon <i>Glassy</i> fount has heard my	
[moan,	
Enough to pierce a heart of stone,	
But all my <i>Words</i> are vain ;	
No pity dwells in <i>Fanny's</i> breast,	
In <i>Truth</i> , it does not her molest,	
To hear me thus complain.	
<i>Nosegay</i> for my charmer's breast,	
In hopes to win her heart ;	
But she, for whom I daily mourn,	
Gives me a <i>Thistle</i> in return,	
To aggravate my smart.	
If I had bags of <i>Gold</i> in store,	
I'd give them all, and ten times more,	
This cruel maid to gain ;	
But if I never gain her hand,	
I'll spend my days, at fates com-	
In misery and pain. [mand,	

6. *Henry and Maria: by Mr. G. H. Isitt.*

Each night as Sol retires to seek his rest,
Behind the *Clouded* curtain of the west,
Maria, beauteous, gentle, kind and fair,
Doth to yon unfrequented grove repair ;
(Not where the lily or the blushing rose
In tasteful order gracefully compose) ;
Where nought but *Thistles* rear their lonely head.—
But hark ! that's sure her well-known Henry's tread,
Can *Words* express how happy lovers meet,
The kiss how melting, and the lips how sweet ;
With *Truth* once more his ardent love to show,
Protests she's fairer than the purest snow ;
Her *Nose* so modell'd, such majestic air,
That scarcely Venus can with her compare.
No *Glass* she needs to heighten beauty's charms,
And, Helen like, inspire the soldier's arms.
Haste, then Maria, haste and let our hands
Be firmly join'd in Hymen's silken bands ;
No *Fan* or *Guineas* should our thoughts employ,
But firm we'd fix them on sublimer joy.

7. *Address to Mrs. Porritt: by Mrs. Richardson.*

To raise the song of youth, that charm'd thy soul,
And led the concert of our joyful groves ;
(Where *scenes* of pleasure in rotation roll,
And nymphs and swains still sing their artless loves;) ;
Tho' call'd by thee ! (and painful to refuse !)
Tho' harsh my sounds, and broke with many a sigh ;
The lyre that warbled to the *breathing* muse,
Tho' tuneless now, and thrown neglected by :
Yet, fond remembrance paints those *downy* hours,
When hand in hand, amid the rural throng,
We stole the pride of Hilda's laughing bowers,
To form sweet *Nosegays*, or adorn the song.
And oft, when anguish swell'd thy gentle breast,
(For sensibility's mild soul was thine)
With soothing strains I hush'd thy cares to rest,
Or caught thy sighs, and made thy sorrows mine.
Now, strangers to each other's weals or woe,
Our childish cares and *golden* dreams all o'er ;
Still *true* at friendship's shrine, my tear shall flow,
Till thy Eliza's heart shall heave no more.

Enig. 5, is a *Cloud.*

No. 14. Supp. Enigmas answered. 13

8. On Miss Eliza Wright: by Mr. Tho. Rimmer.

Was I of all the *World* possest,
I'd part with ev'ry *Guinea* quite;
Cou'd I obtain and make her blest,
The much esteem'd Eliza Wright.
No riches here below I'd crave,
Noshining jems or jewels bright;
Wou'd providence but let me have
The much esteem'd Eliza Wright.
When winter, with his frigid train,
Hail, frost and snow, did her
A miff and tippet I wou'd deign
To buy, for sweet Eliza Wright.

Or, when bright Sol, in summer's day,]
[his might;
O'er power'd her, fainting with
A *Fan*, to cool his scorching ray,
I'd buy for sweet Eliza Wright.
Old age wou'd be to me as youth,
Tho' *Glass* or *Nose* shou'd sit
[upright;
The *Clouds* of life wou'd be, in *Truth*,
No *Thistle* with Eliza Wright.
But, shou'd some other swain
[appear,
Than I, more graceful in her sight;
Adieu I'd bid, with falling tear,
The much esteem'd Eliza Wright.

9. Ode to a Crust of Bread and Cheese, and a Pint of Beer: by Mr. Rob. Sanderson, Coventry.

Hail trio, by whose magic pow'r
I've smil'd on many a care-fra'u'
Deign listen to those lays; [hour,
Which, for great services receiv'd,
A weight, who oft by you reliev'd,
With gratitude now pays.
Enliven'd with a little ease, *This-*
A crust of bread and mouldy cheese,
And eke a pint of beer;
Honesty in a great man's smile,
Pleasure, in down right dray-horse
I've seen as noon-day clear, [toil,
Myst'ries enveild by awful fate,
Too deep for any vulgar pate,
And plaguy crabbed latin; *ea.*
Your pow'r has made me soon un-
strip,]
[skip,
And eke with dext'rous swiftness
The tho'ts and language pat in.
Bestriding oft' a friendly style,
I've ken'd a house at half a mile,
That held you all in plenty;
To warm my heart, the view ne'er
[miss'd,
I've run and grasp'd you in my fist,
And giv'n you blessings twenty.

Why need I blush to tell the tale,
I've never known your magic fail,
In life's most furious blast;
When ins'lence, his disdainful brow,
On fortune, the deceitful shrew,
On me her frowns have cast.
Ev'n tho' I've seen, to gain a place,
A man all honesty disgrace,
Below himself demean him;
Nay tho' I've seen, in poinpous
[pride,
Thick scullius in a chariot ride,
Yet still unmov'd I've seen him.
Some there may be (and yet there
cannot,)]
[sonnet,
Who solve a problem, write a
And care not much about ye:
But be it so—for my part, I
As soon cou'd make this carcase fly,
As write a line without ye.
Wild rants of Heliconian streams,
Aonian mounts, (mere idle dreams!)
We ev'ry day may hear;
No other aid be mine but these,
A crust of bread and mouldy cheese,
And eke a pint of beer.

10. *To all Brother and Sister Diarians: by Mr. T. R. Smart.*

Ye gents and fair ladies, what *Words* shall I find,
 To persuade you for once to be all in a mind?
 I wish your subscription, and fain would your bard
 Gain your cash for his trouble, your smiles for reward.
 I've been busy translating a piece from my poet,
 And an author's next wish is, in public to shew it;
 But the times are so odd, to dispose of one's ware,
 I scarcely dare try, till I'm safe, I declare.
 'Tis you my old friends that I fain would engage,
 To set all your names in a list on my page.
 The *Ars Poetica* of Horace I offer,
 And I flatter myself you'll accept of the proffer,
 With notes to explain, by my Sanderson pen'd,
 And the *Carmen Seculare* join'd at the end.
 The subscription is small, if you please to come down,
 Instead of a *Guinea*, I ask but a crown.—
 Old Horace was merry, he lov'd a sweet lass,
 And his evenings would sit with a friend o'er a *Glass* ;
 Like him your petitioner savors a joke.
 When immagr'd in a *Cloud* of Virginian smoke;
 Not caring a fig for the world as it goes,
 If contented he dip in a bumper his *Nose*.
 I hope in this work you'll find something amusing,
 That may balance the price, and the time of perusing.
 The manners of Romans in Horace's days,
 Their *religion*, their learning, their politics, plays ;
 The charest of virgins will find in our plan,
 Not a line that need force 'em to blush thro' a *Fan*.
 Those who chuse to subscribe, when *This* letter they spy,
 'To our good Doctor Hutton will please to apply,
 By a line when their *Diary* productions they post,
 And the favor will e'er be my pride and my boast.
 In the course of next year I shall fully explain,
 Where each friend, he or she, may their copy obtain.

11. *The same answered: by Mr. Poussin Walker, Nottingham.*

Permit me, dear Di, a few hints to disclose,
 Philosopher like, with my *Glass* on my *Nose* ;
 I then have no doubt but to you I can show,
 In a very few *Words*, what you wanted to know.
 A *Guinea* and *Cloud* two enigmas unfold,
 And *Truth*, shews another, more precious than gold.
 But hold, my dear lady, the *Thistle*'s to come :
 For Dorothy's *Fan* too, your page must make room.

12. *An Elegy: by Mr. W. W. Wardley, of Witney.*

Often when night her pitchy robe, | Two cats, to breathe soft tales of lo
 O'er hill and dale had spread, | (For love subdues them all)
 In darkness wrapping half the | Wou'd on the wings of rapt
 [globe, | [mer
 And folks were gone to bed; | To the appointed wall.

No. 14. Supp. Enigmas answered.

15

This Nan, who with the tortoise
In ev'ry Clouded grace; [vy'd,
That Dick, the envy and the pride,
Of all the tabby race.
There, taking nature for their guide,
Possessing and possess'd!
How happy they, no craving void,
Left aching in the breast.
But bliss like this was too supreme,
For mortal cats below!
Soon, soon it vanish'd like a dream!
The fates wou'd have it so!
One luckless night Dick sou't the
[wall;
But Nan, with sleep oppress'd!
Hear'd not his oft repeated call;
I weep to tell the rest!
Impatient of his love's delay,
The scene of former joys,
Grew irksome; lovers (wise men
Do all but love despise! [say])
So quick to seek whom best he lov'd,
He sprang, nor look'd before;
The negligence soon fatal prov'd,
For an! he 'rose no more.
But drop'd, suspecting no mishap,
(For it was order'd so)
By fate impell'd, into a trap,
That gaping stood below.
Nan, who in sweetest slumbers lay,
Till rosy-finger'd morn,
Chasing the shades of night away,
With spangles deck'd the thorn.
Awaking, heard, in accents low,
The gossip' rumour tell,
(Enlarging on the tale of woe)
How Dick untimely fell!
Alas, poor Dick! in plaintive mew,
She said—and deeply sigh'd,
My Glass is run, I follow you—
Then clos'd her eyes and—dy'd.

N. B. The 4th is a *Guinea*, and the 7th a *Thistle*.

13. *The Banks of the Tyne*: by Mr. Wm. Watkins, of Prudhoe.

Ye sylvan songsters, ever gay,
And cheerful on the blooming
spray,
Your matchless notes combine;
And while the vernal shadows fly
Along the azure Clouded Sky,
Sing on the banks of Tyne.
Celestial river! more renown'd
Than Styx by dismal Tophet bound
And sweet as filter'd wine;
The nectar which the Gods of old,
(As the romantic speech is told)
Was broached from the Tyne.

The *Thistle* crowned *Guinea*, bright
As polish'd Glass, may please the
And fingers, such as mine [sight,
The lily fair, and blushing rose,
With fragrance ravish ev'ry Nose,
Upon the banks of Tyne.
Howsportive fly the zephyrs round
The curling waves, and fan the
ground,
To make its streams divine;
While ev'ry tongue in honied lays,
With melting harmony and praise,
Sings on the banks of Tyne.

Other general and ingenious answers to the Supplement Enigmas,
were also given by the following ladies and gentlemen, viz. John
Ashcroft, P. Barlowe, John Cairns, Tho. Crosby, P. S. Dale, T. S.
Evans, J. Ewbank, John Fildes, Jos. Hindson, Jacobus of Norwich,
D. Lewis, J. Barren, Tho. Nield, Ben. Richardson, Alex. Rose, John
Savage, John Smith, Emma Vernon, Geo. Walton, Eliza Wright, &c.

REBUSES AND CHARADES ANSWERED.

*In the Diary.**Rebuses.*

- 1 Cleypole
2 Poetry
3 Woolwich
4 Smart

Charades.

- 1 Snowball
2 Deathbed
3 Pillage
4 Stagecoach

*In the Supplement.**Rebuses.*

- 1 Gregory
2 Beauty
3 Philipson
4 Furnass

Charades.

- 1 Windlass
2 Churchill
3 Cupboard
4 Oxford

DIARY REBUSES AND CHARADES ANSWERED.

9. *The Diary Rebuses and Charades answered: by Mr. J. Bayley.*

The Rebuses all are compos'd with much art ;
Namely, *Cleypole* and *Poetry*, *Woolwich* and *Smart*.
The Charades so abstruse too, if right I them call,
Are, *Deathbed* and *Pillage*, *Stagecoach* and *Snowball*.

10. *The same: by Mr. John Fildes, Schoolmaster, Liverpool.*

Learned *Cleypole*, in *Poetry* most men excels ;
And at *Woolwich* 'tis known a *Smart* genius dwells.
Very pale like a *Snowball*, on *Deathbeds* some lie ;
While to *Pillage Stagecoaches* highwaymen oft try.

11. *The same: by Mrs. Jane Hales, Deenthorpe.*

If *Cleypole* and *Smart* in a *Stagecoach* shou'd ride
To *Woolwich*, where *Hutton* the learn'd doth reside,
While neat scraps of *Poetry* they make by the way,
On *Snowballs* or *Deathbeds*, or other new lay ;
May the road from the *Pillager* always be free,
That safe on arrival their friend they may see.

12. *The same: by Jacobus of Norwich.*

The *Stagecoach* to *Woolwich* me quickly convey'd,
Where I to the Doctor my compliments paid ;
Admir'd his *Poetical* talents and art,
And made kind enquiries for *Cleypole* and *Smart*.
But the *Snow* flakes had cover'd the land put in tillage,
And ev'ning approach'd : so I, fearful of *Pillage*,
In haste took my hat, and speedily fled,
To *Greenman* on the *Heath*, and there went to bed.

13. *The same: by Mr. Alex. Rowe, Reginnis.*

Cleypole, Poetry, Smart, and Woolwich,

The first four answers do declare ;

Then *Deathbed, Pillage*, with the *Stagecoach*,
And *Snowball*, make the rest appear.

14. *The same: by Miss Emma Vernon, Liverpool.*

Since *Smart* and B. *Cleypole*, to *Woolwich* oft send,
Poetic epistles, to *Hutton* their friend ;
And sundry young females such favors enjoy,
I quit my dull ease and domestic employ ;
Invoking the muses to teach me the way,
Of aptly inserting *Stagecoach* in my lay ;
While *Snowball* and *Deathbed* and *Pillage* will end,
In charadical jumble, the lines of a friend.

No. 14. Supp. Rebuses, &c. answered. 17

SUPP. REBUSES AND CHARADES ANSWERED.

1. Address to Darians: by Mr. W. Butterman.

Once more the muse her annual tribute sends,
With compliments to all Diaria's friends,
Whose active genius can aright divine
The much-lov'd *Beauty*'s of each flowing line,
Oh! wou'd the muse with me excursive rove,
To meet friend *Gr:g'ry* in the vocal grove,
How sweet the circling hours wou'd pass along;
While *Furnass* charms us with her pleasing song;
Shou'd *Philipson* also attend the lyre,
Our thoughts to diff'rent regions wou'd aspire.
E'en *Churchill*, *Cupboard*, *Oxford*, and *Windlass*,
Shou'd not without a kind attention pass.
Then say, ye gents, in Dia's blooming page,
At once the pride and glory of the age,
Shall I! toss'd long by giddy fortune's pow'r,
At length find shelter in your shaded bow'r?

2. The same: by Mr. P. S. Dale, Liverpool.

Gregory, *Philipson*, *Beauty*, and *Furnass*,
The rebuses all will briefly explain;
Then will *Churchill*, *Oxford*, *Cupboard*, and *Windlass*,
Shew with precision the rest that remain.

3. The same: by Mr. John Fildes, Liverpool.

When *Gregory* writes, in each line he displays
Such *Beauty*, he certainly merits much praise.
Miss *Philipson*'s charms have a poet inspir'd;
And *Furnass*'s verses by all are admir'd.
A *Windlass* both handy and useful is found;
And *Churchill*, alas! is laid low in the ground!
A *Cupboard*, when empty, quite beggarly looks;
And *Oxford* is fam'd both for scholars and books.

4. The same: by Mr. Wm. Francis, Jun. Bath House Academy, Hampstead, Middlesex.

Gregory doth in learning shine;
Let *Oxford* own his merit;
And *Philipson*, a lass divine,
May *Beauty*'s claim inherit:
Yet Dia's queen shall *Furnass* reign;
In mystic veil she'll bind fast,
With lays, that rival *Churchill*'s
A Cupboard, or a *Windlass*. [strain,

5. Address to the Editor: by Mr. Wilos Hostman.

Sir, I have try'd, and try'd again,
Till I have almost crack'd my brain,
To find your puzzles out; [name,
At length I made out *Gregory*'s
And *Churchill*'s too, of noted fame
That two will name no doubt.
Next *Beauty*, *Oxford*, and *Furnass*,
Added to *Cupboard* and *Windlass*
Will other five explain;
Then only *Philipson* remains,
Who wou'd reward me for my
If I cou'd her obtain. [pains,

6. *The same: by Mr. T. R. Smart.*

The work of friend *Gregory* certainly shines,
 Mrs. *Furnass* by me is admir'd ;
 And Warkman decidedly tells by his lines,
 By *Philipson's Beauty* he's fir'd :
 Then *Windlass* 'twas hoisted the stone thro' the air,
 With *Oxford* where learning has post ;
 My *Cupboard* an article us'd by the fair,
 And *Churchill* who charms with his ghost.

7. *The same: by Mr. John Smith, Alton Park.*

Gregory, Philipson, Furnass, and Beauty,
 One half of these puzzles unfold ;
 Then *Windlass* and *Churchill*, and *Cupboard* and *Oxford*,
 Subjoin, and the whole will be told.

8. *The same: by Mr. John Sowerby, of Dudley.*

Gregory in learning takes delight,
 And *Furnass* does with *Beauty* write,
 While *Philipson* attracts the beau ;
 The *Wind* blew high, the glass was broke,
 And out o'the *Cupboard* gold was took,
 By villains of *Oxford*-Row.
 Great *Churchill* too, old England's boast
 Was on the waves of fortune toss'd,
 But still remain'd the same ;
 And Gallic's sons, a haughty race,
 Cou'd not behold to see his face,
 But trembled at his name.

9. *The same: by Mr. Poussin Walker.*

'Tis *Gregory* the muses claim,
 For him the garland weave ;
 And *Philipson*, with *Beauty*'s flame,
 Hath caus'd a heart to heave.
 T' *Furnass*'s poetic pow'rs,
 Lamented *Churchill* sing ;

For them I'd cull the choicest
 [flow'r,
 That grow near Eden's spring.
Oxford too, my praise shall share,
 The nurse of many a bard ;
Windlass, Cupboard, I declare,
 Are worthy my regard.

10. *The same: by Mr. W. W. Wardley, of Witney.*

Beauty is a transient flow'r !
 Short-liv'd being of an hour !
 Aptly form'd to please the eye ;
 While reflection heaves the sigh,
 That those charms at noon dis-
 [play'd,
 Ere the day be spent may fade !
 So I've seen a blushing rose,
 In the morn its leaves disclose,
 Fresh and blooming to the sight,
 Droop and wither ere 'twas night !

Greg'ry! I appeal to you,
 Is not this, alas ! too true.
 Hence yedamsels, young and gay,
 Throw not time and pains away,
 On those charms, by rigid fate,
 Doom'd to an uncertain date.
 But with tuneful *Furnass* vie,
 For such fame as ne'er can die !
Philipson! whose tuneful lays,
 Win and merit *Churchill*'s praise.

No. 14. Diary Queries, answered. 19

Happy in each pleasing art,
That can lasting joys impart,
Slighting ev'ry fancy'd grace,
Coveted in form or face.

Courting *Beauties* more divine,
Kneels at sage Minerva's shrine;
Whence inspir'd, behold her rise,
Th' fav'rite of the good and wise.

* * The 3d Ch. is *Cupboard*, and the 4th *Oxford*.

11. *The same: by Mr. Wm. Watkins, Prudhoe.*

Gregory, renown'd and brave,
May Beauty, wit and learning have,
And Philipson engage;
But Mrs. Furnass' potent lay,
Does clearly bear the bell away,
And charms the present age.

No Windlass, in yon lofty tow'r,
Equals with her melting pow'r,
Nor Churchill, fam'd of yore,
Such strains extatic e'er cou'd write,
Nor Oxford o'er his cups indite,
'Tho' skill'd in mystic lore.

Various other ingenious answers to the Supplement Rebuses and Charades, were given by the following ladies and gentlemen, viz. J. Ashcroft, Atalanta, J. Cairns, Tho. Crosby, J. Croudage, T. S. Evans, J. Ewbank, J. Hindson, Jacobus of Norwich, G. H. Isitt, W. Lemon, Da. Lewis, Tho. Nield, Tho. Rimmer, Alex. Rowe, J. Savage, J. Schofield, Tho. Squire, Geo. Walton, Eliza. Wright, &c.

QUERIES ANSWERED.

1. DIARY QUERY answered: by Mr. David Lewis, Knaresborough.

Voyagers tell us, that in Paraguay, the ladies usually make the first address to the men, through the medium of the Jesuit Missionaries, in which they commonly succeed. In the Isthmus of Darien, the proposals are made by either sex. In the oriental countries, the fair sex are generally enslaved, and of course precluded from making any overtures of that kind. We may therefore conclude, that the present practice of courtship, in Europe, is founded in custom, more than in nature.

Mrs. R. Ward, of Kidderminster, says,— Perhaps it is more consistent with the modesty and reserve, which are so pleasing in the female character, that the man should in general make the first overtire; but in particular cases, it is no way improper for the female to do it; and were a little more latitude allowed in this respect, than custom admits, perhaps there would be fewer instances of celibacy, in both sexes, and a greater sum total of virtue and happiness in both.

2. DIARY QUERY answered: by Mr. Tho. Myres, Hovingham.

As philosophers affirm that the moon and the earth are both opaque bodies, and that the light which we behold in the former is purely transmissive; there is the same reason to suppose that the earth does the same in reflecting the sun's rays to the moon, as the moon does in reflecting them to the earth.

20 Diary Supplement, 1801.

*Mr. Charles Pritty, says,—*This dim light seems to be the sun's light twice reflected, i. e. from the earth to the moon, and from the moon to the earth again; at least so that we can perceive it, and is what we may call the Lunarian's moon light, it being at that time night to the inhabitants on our face of the moon.

3. DIARY QUERY answered: by Jacobus, of Norwich.

When an empty glass is sounded, and water poured in, the note becomes graver in proportion to the quantity of water; and the vibration is impeded by the water being so much heavier than air, that it requires more force to produce a concussion, and also to continue the vibration.

*Mr. Charles Pritty, says,—*By experiments made with water and mercury, I found that the denser the fluid is that is poured in a glass, the graver the tone is. But it does not appear that the tone is entirely destroyed in that part of the glass which contains the fluid; but that the fluid retards the motion of the tremulous part of the glass, which causes the note to be graver. But I do not conceive the theory of musical sounds in the least affected by this experiment.

4. DIARY QUERY answered: by Mr. Rob. Sanderson.

The first novels of Chivalry were written in the Romanic language (a mixture of Latin with the Teutonic, and the origin of many of the present living languages), and from thence derived their name Romance. It may not be amiss to remark, in tracing the origin of this word, that it has found its way into many of the southern counties of England, and used as a verb.—As books of chivalry necessarily include a great quantity of fiction, so this word retains its original meaning pretty well; for, to say a man romances, is only a polite way of saying, he lies.

1. SUPP. QUERY answered: by Jacobus, of Norwich.

The custom of employing buffoons or jesters, arose from their fitness for exciting laughter by their tricks and oddities; and it is well known that laughter is one of the greatest promoters of digestion. Therefore it answered two purposes, as well that of keeping the family in good humour, and affording them mirth and entertainment, as that of preserving their health, and at the same time assist digestion.

*Mr. David Lewis, says,—*It is judiciously observed by physicians, that cheerfulness and good humour, are conducive to health. This might afford the hint to our ancestors, of pro-

moting them at their meals, by entertaining some ingenious dro at their tables, whose facetious tales might assist digestion, by exercising their risible faculties.

Mr. Alex. Rowe, says,— This practice was, perhaps, intended to expel heaviness, raise hilarity, and whet the appetite.

2. SUPP. QUERY answered : by Mr. Tho. Molineux.

The hours of sun-setting at London, lat. $51^{\circ} 31'$ north, on every day in each month (as given in the Ladies' Diary, or in White's Ephemeris, for 1798,) being added together, and the several results doubled, give the total duration of day-light, as in the following table :—

Year 1798.	No. of Days.	Durat. of Day-light
January	31	259 ^h 32 ^m
February	28	278 22
March	31	367 46
April	30	415 12
May	31	482 44
June	30	494 32
July	31	496 38
August	31	449 00
September	30	377 00
October	31	328 26
November	30	263 56
December	31	242 50
Total	365	4455 58

Hence it appears, that the total amount of day-light, at London, in the year 1798, was 4455 hours and 58 minutes; making, on an average, 12hrs. and $12\frac{7}{6}$ mins. one day with another. The total duration of night was 4304 hrs. 2 mins. On the whole, therefore, there is a balance of 151hrs. 56 mins. (exclusive of the erepusculum) in favour of day-light.

The days are longest in June, the average length of a day, in that month, being 16hrs. 29 $\frac{1}{15}$ min.; and the days are

shortest in December, the average then being no more than 7 hrs. 50 mins.

3. SUPP. QUERY answered : by Mr. John Ashcroft, Barlaston

In examining the words, “ Roasting of Eggs”, I plainly find the letters which spell the word “ Reason”, from which perhaps the expression originated.

Otherwise, by Mr. Da. Lewis, thus,— Eggs, when laid too near the fire, will burst, by the sudden rarefaction of the inclosed air. This may be prevented by first pricking them through the shell: which, being an act of reason, or art, may have given rise to the adage.

The same, by Mr. J. Turner,— It is a known fact, that the air is an elastic fluid, and that the elastic force or spring is considerably increased by heat.—Now, in every egg there is a bubble of air, at the thicker end between the shell and the interna.

skin, which, on the egg being exposed to the fire, acquires so great a degree of elastic force, by means of the heat, as even to break the egg, and sometimes, if not impeded by external obstruction, throw it out of the fire. To remedy which, it has been found necessary to give vent to the air, by gently cracking that end of the shell which contains it. From which, no doubt the adage has originated.

4. SUPP. QUERY answered : by Mr. W. Burdon.

Whatever art or science any person studies and practices the most, in that particular art or science he must become the most skilful. Thus, the philosopher, by leading a studious and retired life, gains knowledge; while a person that is less learned, has leisure to mix among mankind, by which he acquires that easy assurance so conspicuous in what is called a well-bred man.

The same, by Mr. Wm. Francis, Jun.—The mind of a philosopher is fixed on more important objects, than the comparatively trivial forms and civilities of the fashionable world; and, provided his words and actions are sincere, he probably imagines, that the mode of expressing and performing them, is of little consequence. The other, however, having little else to recommend him, endeavours to attract notice by his superior politeness, and frequently mean condescension.

*To the same purport, Mr. Da. Lewis, says,—*The philosopher makes it his chief study to attain perfection in the sciences, while he neglects exterior matters: But the smatterer contents himself with a superficial view of learning, neglecting the sciences, for the study of the graces.

*And Mr. Alex. Rowe, says,—*Smatterers in learning generally aim at politeness, to make a greater display of their little accomplishments; while the attention of real philosophers is employed on subjects of greater importance.

Thus various and ingenious answers to the Queries, both in the Diary and Supplement, were given by the following ladies and gentlemen, viz. Anonymous, J. Ashcroft, Junius Barren, Tho. Boxer, Ja. Hews Bransby, W. Burdon, W. Butterman, J. Cairns, Tho. Crosby, Tho. Elmer, Wm. Francis, J. Furnass, Wm. Goss, Jos. Hindson, Jacobus of Norwich, J. Johnson, Da. Lewis, Tho. Molineux, Tho. Myres, Cha. Pritty, Alex. Rowe, J. Savage, Tho. Scutrr, R. Smithson, Rd. Simpson, Tho. Squire, J. T. J. Turner, R. Ward, Eliza. Wright, &c.

NEW ENIGMAS.

I. ENIGMA, by Mr. J. Bayley, Middleton.

Ladies, I humbly crave you'll please reveal
 What you sometimes, and I wou'd now conceal ;
 Yet, strange to think, that I shou'd be so vain,
 To strive to hide, what you'll with ease obtain.

Ye fair, if of my birth you'd wish to know,
 My parentage to you I'll quickly show :
 As Pallas was the offspring of Jove's head,
 So I from learn'd, ingenious brains am bred ;
 And, to act suitably to my descent,
 In studies deep my sprightly thoughts are spent ;
 For what I've studied so, I never mean
 That others shou'd more easily obtain.
 Proteus like, I num'rous forms do bear,
 My names as various as my forms still are.
 To form me quite complete in ev'ry part,
 Demands a share of labour, and much art :
 Always a sort of magic skill I try,
 To cast a mist before my lover's eye ;
 That he mayn't see me, for I'd have it so,
 Then leave the 'widder'd elf in statu quo.
 But ladies say, who best my nature scan,
 I'm brother to that dark dissembler man ;
 Yet not like that vain fugitive I range ;
 Fix me once right, and I can never change.
 Enough I've said, now ladies please to try,
 To find me out ; for now, sure, I am nigh.

II. ENIGMA, by Mr. John Fildes, Liverpool.

Long time before man was created, my birth
 I date, and have been in all parts of the earth ;
 As Anson, or Byron, or Cook always found,
 When they, bold adventurers, sail'd the world round.
 My present abode, if you wish to descry,
 You'll find me within half a foot of your eye.
 To lose me, by some men is thought a disgrace ;
 And me in the market you daily may trace.
 Old Adam well knew me, for in me he dwelt,
 Before either trouble or sorrow he felt.
 When Cain slew his brother, he then in me stood,
 And Noah I shelter'd too during the flood.
 I thousands of persons befriended of old,
 Whose names at this time by me cannot be told.

Not far from the fire you may find me each day ;
 And in the church-yard, where dead bodies decay.
 I'm often the cause of contention and strife,
 Among men in different stations in life.
 'Tis plain, in the sun, moon, and stars, I must be
 This moment, yet doubtless they all are in me.
 By me many hundreds a good living get,
 And many a hundred for want of me fret ;
 Tho' they without me cannot be it is true,
 And when they see any thing, me they must view.
 Now, ere my account of myself I conclude,
 One favour I ask, ladies, think me not rude,
 Which is, that myself I may keep among you,
 Then may you succeed in whate'er you pursue ;
 And at the last day may your sins be forgiv'n,
 You then will be sure to obtain me in heav'n.

III. ENIGMA, by Mr. J. F. Hatfield, Mansfield Academy.

Whether beside Euphrates' holy flood,
 Or Jordan's sacred banks, my parent stood ;
 Whether on shady Libanus I grew,
 Or Horeb's lofty top, expos'd to view ;
 It is not told, nor does th' historic page
 Disclose my birth, or certify my age,
 Tho' doubtless ere the flood on earth I stray'd,
 And pristine ages knew my use and aid.—
 In Woodland glooms my parent has her rise ;
 On lofty hills, and nodding in the skies ;
 Or fertile vale, just by a river's side,
 And stands reflected in the glassy tide.
 Hence torn by man, and subject to his rules,
 I'm doom'd to bear an artist's piercing tools ;
 Till turn'd to shape, and sure 'tis sore abuse,
 Tho' quite a worthless thing till put to use.—

When marching squadrons beat the sounding plain,
 With measur'd steps, and form the marshall'd train ;
 When the toss'd bark rides bending to the blas
 And the brown sea-boy hugs the groaning mast
 In scenes like these 'tis seldom I appear,
 Tho' here, alas ! my cause is oft too near.
 Sometimes I'm gay, and visit play or ball,
 And jaunt with beaux to Sadler's or Vauxhall;
 At masquerades I scorn not to advance,
 But pardon, ladies, I shou'd blush to dance.—

When royal George, protector of these isles,
Greets return'd heroes, and bestows his smiles,
'Tis not prophane to say, when I draw near,
His heart gives blessings, and his eye a tear.—
But, O this fickle world ! how chang'd the scene,
When at some giddy race or fair I'm seen
With some poor wand'ring wretch to take a part,
And bear thro' guileful paths his rakish heart !

On Sundays, church I frequently attend,
Faithful to him on whom my hopes depend ;
And come not there, like some, new modes to see,
But all the time am humbly on my knee.—
You'll say, I'm sometimes great ; not really so,
For two feet stature's only reckon'd low ;
One foot I only boast ; a pound in weight ;
But merit's not confind to size or height.—
There's one vile epithet insults my name,
(I blush to own it) and contracts my fame ;
Take that away, three letters will appear,
Which ladies you will name another year.

IV. ENIGMA, by Mr. B—d H—n, London.

Shall I once more attempt the puzzling strain ?
To please the *fair*, or shall I write in vain ?
The fair commands the tribute which I bring ;
What muse for beauty can refuse to sing.
I care not for the critic's rage or wrath,
She, who commands it, is of more noble worth.—
To man I render much essential good ;
Black as old Satan, yet as red as blood.
Without my aid in vain the merchants toil ;
In vain might grow the products of the soil.
Long might dear friendship, at a distance mourn,
Without me ; 'tis I your thoughts make known,
And from the deep recesses of the heart.
Love's secrets thence, to him alone impart.
Like fair hypocrisy, I can disguise,
And e'er deceive the very keenest eyes.
But by fair chemic's art I'm brought to light,
And made t'appear the perfect hypocrite.
Shou'd you, fair females, e'er be brought to *test*,
You still will find that honesty is best.
Be not offended, where n' offence is meant,
But on my riddle's answer be intent.

To help you then, from this perplexing scene,
Know that I'm either violet, yellow, blue, or green,
'To all alike invisible and seen.

But lo! to give you still the more surprize,
I am this moment plac'd before your eyes.

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V. ENIGMA, by Mr. G. H. Isitt, of Stanion.

Ladies, awhile your attention lend,
Unto your most obsequious friend,
Who wou'd, had he Apollo's quill,
His tale disguise with mystic skill.
But since that is not his good lot,
Hopes you'll accept of this he's got.
Behold, from endless night I usher in,
And on this stage my various arts begin ;
No sooner in this busy world I'm known,
Than, Shadrack like, I'm in a furnace thrown,
From thence am form'd by the mechanic's art,
And all my services to man impart :
I'm such a useful serviceable thing,
I aid the peasant, cobler, peer and king.
Oft at my awful mandate victim's bleed ;
And innocence itself was once decreed
To feel my pointed venom, and to die,
If we on sacred records may rely ;
High poiz'd in air, and by a father's hand,
Till stopp'd by an omnipotent command.
Albion may bless that great propitious hour,
That sav'd her royal sovereign from my power ;
Oh ! may he long enjoy that life I sought,
And all his enemies to shame be brought :
Tho' all must own I've useful to him been ;
To sup or dine am always with him seen :
But, like mankind, my temper you will find
Sometimes a good one, others not so kind.
Essent al service do I lend to trade,
Tho' like great Nelson a one handed blade.
But here I'll stop my babbling, flippant tongue ;
I doubt my tale is tedious, and too long.
Then, till next year I bid dear Di adieu,
And leave my name to be found out by you.

VI. ENIGMA, by Mr. James Maver, East Lane, Walworth.

Avaunt all ye swindlers, ye robbers and stealers,
Ye pick-pocket rascals, and counterfeit dealers ;

For here comes a tyrant, whose powerful sway
Subdues and enslaves all who come in his way.
Now to shew who he is, and to hinder your fall,
Turn backward his name, and you'll see not the whole ;
Or if the first letter you take from the others,
And give what remains to your friends or your brothers ;
If you give it both freely and with a good grace,
They'll perhaps chide you smartly, tho' smile in your face.
Invert this remainder, and think it not strange,
If it point out a term much in use at the 'Change.
But if from the whole you the last letter take,
Then reverse those remaining, they readily make,
In the singular number, what many a fellow
Is made to be master of, I cannot tell how :
But otherwise change them, with ease you may see,
A being who generally lives on the sea.
Transpose them again, and they shew without fail,
What dreadeth the whole, as a thief does a jail.
Ye wits, in next Di'ry pray let it be seen,
What this odd enigma, can possibly mean.

VII. ENIGMA, by Mr. T. Wcedem.

To ease the mind, with doubts and fears opprest,
To give the lab'ring, troubled conscience rest,
To avert despair, and horror's sable gloom,
Ye beauteous fair, with smiles I gladly come.
When Adam first incur'd the wrath of heav'n,
I, as a comfort, to his soul was given :
His tears I wip'd, his sorrows I appeas'd,
I help'd his prayers, and all his labours eas'd.
To all his sons I've prov'd a faithful friend ;
The rich and poor I equally attend :
The king, the prince, the beggar, bond and free,
And Jew and Gentile, are alike to me :
I aid them all, I give them all relief,
When sunk in sorrow, or oppress'd with grief.
Elate with me, young Strephon boldly goes,
A union with fair Celia to propose :
If Celia frowns, and bids the youth depart,
I bid him still his am'rous suit impart,
Till he has won her love, and gain'd her heart.
In every clime, in every place I dwell,
Except with angels pure, or demons fell.
Now guess my name, and tell the world around,
What a dear faithful friend in me you've found.

VIII. OR PRIZE ENIGMA; BY CUMBRIENSIS.

*Whoever answers it before Candlemas Day, has a Chance by Lot
for Six Supplements.*

Diana a hunting one morning wou'd go ;
What pleasures are equal to chasing the roe ?
A king drest in scarlet, his nobles the same,
Each eager to start for the laurel of fame.
The huntsman had travers'd a thicket or more,
And ey'd, of fine females, at least half a score ;
When smack went the thong, as a signal for chase,
And echo like thunder pervaded the place :
The hind at full speed, breaths defiance and scorn,
To huntsmen and hounds, and the sound of the horn ;
While a host of blood-reds, all drest capapee,
Each vie with the others, the sport all to see.
The roe sought the stream, and the dogs shot the tongue,
The Goddess drew bit, for her nerves were unstrung ;
While peals of loud thunder, and groans of the dead,
Rung changes of terror from earth's natal bed.
The scene so tremendous, the artist stood mute,
Old Pan dropp'd his reed, and Orpheus his flute ;
Lucina stood peeping from the side of a rock,
T'announce a fair youngling, the birth of the shock.
This child of old nature, admir'd by all,
Was guarded by servants from slip or from fall ;
Till brought to perfection, of beauty and size,
Then stands a colossus, or prostrate he lies.
If Pallas with Venus for beauty contend,
A Paris is chosen, the contest to end ;
But Pallas and Venus have long since been dead,
While I've brav'd all weathers, and liv'd in their stead.
The knight apes the marquis, the marquis his grace,
And each exalts me to some dignified place ;
Like Butler on record I wait on the King,
And millions on millions to merchants I bring.
In Westminster Hall, that dignified place,
Where law without justice might Blackstone disgrace ;
No advocate's firmer, or makes such a stand,
And sometimes am rob'd in a gown and a band.—
Of Virgil the poet, fair Italy can boast,
And we of prime poets, a numerous host ;
But this child of nature surpasses them all,
And reigns without rival in Westminster Hall ;
He's Otway, he's Dryden, Ben Johnson and all,
Stronger than Hercules, and taller than Saul ;

He's much older than Par, and younger than Young,
 What pity P. Pinder his praise has not sung.
 He's a soldier, a sailor, a freeman, a slave,
 No friend to the friendless, or foe to the brave.
 Yet more of t. is hero I'll dare to proclaim,
 He rivals all praise in the annals of fame;
 An historian so just—but this by the bye,
 A tale he may tell, but ne'er yet made a lie.

NEW REBUSES, CHARADES, AND QUERIES.

I. REBUS; *by Mr. Joseph Hindson, Lincoln.*

When I come, adieu distinction,
 Precedence comes to extinction ;
 Letters five compose my name ;
 Read forward, backward, 'tis the same :
 But when twice fifty's from it ta'en,
 There still is left a mother's name ;
 Direct, reverse, her name's alike ;
 From its letters two pray strike,
 Tho' odd it seem, yet still 'tis true,
 Yet five is left unto your view.
 Lovely fair ones, dear to fame,
 This paradox you'll soon explain.

II. REBUS; *by Jacobus of Norwich.*

At my door there stand two, but take only one,
 And add to't a million, one minus ;
 Then I have not a doubt but before you have done,
 You will find who oft causes the horses to run,
 If to ride the fair weather inclines us.

III. REBUS; *by Mr. G. H. Isitt.*

One-fifth of a vessel, for pleasure design'd,
 On the ocean or river flies swift with the wind ;
 Then behind it ye fair, be advis'd by a friend,
 Place a thing that has neither beginning nor end ;
 Next, a man, whom king David had shamefully slain,
 And the God that presides o'er the boisterous main ;
 From these their initials pray take, then I beg
 You'll add what you twice see in every egg ;
 These five letters ta'en, and together combin'd,
 Shew the name of a person, of talents refin'd,
 Whose lines speak his merit, without more enquiry,
 For several years past in your far famed Diary.

IV. REBUS; by Mr. Poussin Walker, Nottingham.

Three-sevenths of a yellow flow'r,
 That grows on fertile plains,
 Which oft, to Deilia adds new pow'r,
 To deck her bosom deigns.
 Th' initial of a bird of prey,
 A mighty river too,
 That thro' Africa winds its way,
 A lovely maid will shew.

I. CHARADE; by Miss Caroline Mortimer.

My First, the generous horse is doom'd to bear ;
 In church-yards seek my next—'tis always there ;
 My whole is useful when loud tempests roar,
 To guide the sailor to his destin'd shore.

II. CHARADE; by Mr. Tho. Rimmer.

See, friends, relations, and a lover mourn !
 The sweet Eliza to my first is borne ;
 Her cheeks, once blooming, like my next are cold ;
 My whole ere this Eliza's death has told.

III. CHARADE; by Mr. Rob. Sanderson.

A stream is my first, that thro' Italy flows ;
 My next, cou'd I but bring it pat in,
 I call a conjunction, as each school-boy knows,
 Of the cop'lative kind—but it is latin.

Rais'd high in the world above the vile croud ;
 Like a bird upon some scaffold pole,
 My whole hums his songs, of those songs too quite proud :
 Darian friends tell that whole.

IV. CHARADE; by Mr. T. R. Smart.

Known by my first, the longitude
 Of city, country, court ;
 And tho' no article of food,
 I am your chief support.

My second is a scene of mirth,
 Lov'd by the charming fair ;
 Tho' sometimes I forsake the earth,
 And fly aloft in air.

Yet tho' my whole gives joy in course,
 A foul return I meet ;
 Impell'd from you by active force,
 And spurn'd by all I meet.

I. QUERY; by Jacobus of Norwich.

Is a Charade a compound of two distinct words, as *Hail-stone*; or a word that may be divided into two, as *Restrain*?

II. QUERY; by Mr. G. H. Isitt, of Station.

Assign me a reason, for gladly I'd know it,

Why poverty's said to belong to the poet?

III. QUERY; by Mr. Rob. Sanderson,

Required the reason why those children, whose judgment and reason are matured earlier than usual, are generally the most short-lived?

IV. QUERY; by Mr. Tho. Squire, Baldock.

It is often observed, during a thunder-storm, that before a clap of thunder, it almost ceases raining; whereas directly after, it rains very fast. Query the reason?

ECLIPSES, &c. IN THE YEAR 1801.

There happens no less than six eclipses this year, four of the sun, and two of the moon, of which the two latter only will be partly visible in these parts. They happen in the following order.

I. The first is a small solar eclipse, on Saturday the 14th of March, at 3h. 20min. after noon. This eclipse will not be visible in these European parts, although the sun be not then set, on account of the moon's south latitude, which makes her place appear beneath the sun's limb. In the unknown southern regions of the earth, where this eclipse is the greatest, the defect, or quantity eclipsed, will not be quite 2 digits, or one sixth part of the sun's diameter.

II. The second is a great eclipse of the moon, being total, and nearly central, which happens on Monday the 30th of March in the morning. At the beginning of this eclipse, the moon will be nearly vertical over the east coast of South America, near the mouth of the river of Amazons; and at the middle she will be vertical near the city of Quito, in the northern parts of Peru; so that the eclipse will be visible from beginning to end in all the continent of America. The beginning and most part of the eclipse will be visible in most parts of Europe and the western parts of Africa; and the end may be seen as far as the Friendly and Society Islands, in the great Southern Ocean. With us, the moon will set totally eclipsed, about $\frac{3}{4}$ past 5 o'clock in the morning. At London the appearance and times will be as follow: Eclipse begins (at b) 3h. 21m. in the morning; total darkness begins 4h. 27m.; the middle at 5h. 19m.; moon sets (at s) 5h. 45m.; total darkness ends 6h. 10m.; and the eclipse ends at 7h. 11m.



III. The third is a small solar eclipse, on Monday the 13th of April, at 4h. 21m. in the morning, before the sun rises, and consequently invisible here. But a small defect may be perceived in high northern latitudes, where the sun is up, as Nova Zembla, and towards the pole.

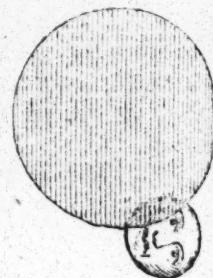
IV. The fourth is also another solar defect, which happens on Tuesday, Sept. the 8th, at 5h. 39m. in the morning, near the time of sunrise, but invisible here, on account of the moon's considerable lat. and distance from her node; but may appear a small eclipse in high northern latitudes.

V. The fifth is another total eclipse of the moon, on Tuesday, the 22d of Sept. in the morning, the beginning of which only will be visible in Great Britain and the other western parts of Europe and Africa. But the whole of it will be visible over the continent of America, and also to most parts of the great South Sea, as at the Friendly, the Society, and at the Sandwich Isles, and other parts in that quarter. At the time the moon sets at London, the appearance will be as in the annexed figure; and the times there are as follow: The eclipse begins 5h. 36m.; total darkness begins 6h. 36m.; middle 7h. 25m.; total darkness ends 8h. 15m.; the eclipse ends 9h. 14m.; the digits eclipsed being $20^{\circ} 1'$; and the moon sets at 5h. 50m. in the morning.

VI. The sixth, or last of these eclipses, is a solar one; which happens on Wednesday, Oct. 7, at 8h. 8m. at night, consequently invisible to us, as well as to all parts of Europe, Asia, and Africa, being only visible in the parts near the South Pole, where a small defect may be observed on the sun's upper limb.

OCCULTATION. On Sunday, May 24, there will be a remarkable occultation of the fine star, Virgin's Spike, behind the moon, from 8h. 53m. till 10h. 4m., at night, being covered by the moon for the space of 1h. 11m.

N. B. The letters for the Supplement, post-paid, must be sent so as to come to hand, at latest, before the end of April; but the sooner before that limit, the better. They must be addressed thus: To the Author of the Ladies' Diary, at Stationers'-Hall, London: The letters of the Hon. Miss M. Dundas, Mr. Smithson, Mr. Lemon, Mr. Nield, Mr. Surtees, as well as of several other contributors, came to hand much too late, to be made any use of in the Diary Supplement.



No. 14. Supp. Questions answered. 33

ANSWERS TO THE SUPPLEMENT QUESTIONS.

I. SUPP. QUEST. (85), answered; by the Rev. J. Ewbank, Vicar of Thornton-Steward.

Let $x+y$ denote the length of the box, and $x-y$ the breadth of it. Now, by the equation, there are given the sum of the squares = 500, and the product of them = 200; that is $2x^2 + 2y^2 = 500$, or $x^2 + y^2 = 250$, and $x^2 - y^2 = 200$. Then, by adding and subtracting these two equations, we have $2x^2 = 450$, and $2y^2 = 50$, or $x^2 = 225$, and $y^2 = 25$; the roots of these give $x = 15$, and $y = 5$; therefore $x+y = 20$, and $x-y = 10$, the length and breadth of the box.

The same; by Mr. Wm. Francis, Jun. Bath House Academy, Hampstead.

Admitting each orange to occupy the space of a 2 inch cube, as seems intended; it only remains to find two numbers, whose product is 200, and the sum of their squares 500. Let x = the greater; then $\frac{200}{x}$ = the lesser; also $x^2 + (\frac{200}{x})^2 = 500$, or $x^4 - 500x^2 + 62500 = 22500$. Hence $x = 20$ the greater, conseq. 10 = the lesser number.

The same; by Mr. Isaac Roxbottom, West Hallam.

Suppose the oranges to be laid in rows, and exactly one on the vertex of another. Then $2^3 = 8$ inches, is the same space occupied by each orange, and $8 \times 200 = 1600$ that of the whole, or the solid contents of the box. Hence $1600 \div 4 = 400$ the double product of the length and breadth, and the sum of their squares = 500 by the question; hence $\frac{1}{2}\sqrt{500+400} \pm \frac{1}{2}\sqrt{500-400} = 20$ and 10, the length and breadth.

The same; by Master F. T. C. Rundell, Baldock School.

Suppose x = the length, and y = the breadth. Then, by the quest. $x^2 + y^2 = 500$, and $8xy = 8 \times 200$, or $xy = 200$; hence, by adding and subtracting double of the latter with the former, gives

$x^2 + 2xy + y^2 = 900$, the root $x+y=30$; here $2x=40$, and $x=20$; $x^2 - 2xy + y^2 = 100$, the root $x-y=10$; also $2y=20$, and $y=10$.

Other ingenious answers were given by Miss Amelia Addison, Messrs. John Ashcroft, Sam. Baker, P. Barlow, John Blackwell Newton Bosworth, W. Burdon, W. Butterman, John Craggs, J. Croudace, J. Furnass, O. G. Gregory, J. Hartley, Jos. Hatfield, John Haycock, Da. Henry, J. Hefford, T. Hewitt, Henry Hunter, John Latey, P. M. Laurent, J. Lockwood, Wm. Middleton, John Mitchell, John Ramsay, Alex. Rowe, John Scholfield, Rd. Simpson, Tho. Scurr, Rob. Shields, R. Smithson, Tho. Squire, Henry Wade, P. Walker, Geo. Walton, John Warkman, Wm. Watkins, Jos. Wilson, Jos. Wooldridge, &c.

II. SUPP. QUEST. (86), answered; by Miss Amelia Addison.

First, 138° are = 23 minutes distance between the hands; and at 9 o'clock the minute hand being 15 minutes before the hour hand, it must from that time gain either 8 minutes or 22 minutes, because either of these leaves the proposed distance of 23 minutes between the hands. Then, since the minute hand gains 55 minutes in an hour, we have,

As $55 : 60 :: 8 : 8\frac{8}{11}$ min. past 9 ;
or $11 : 12 :: 22 : 24$ min. past 9 ; either of which will answer.

The same; by Mr. John Blackwell, Hungerford.

First, as $360^\circ : 60 \text{ min.} :: 138^\circ : 23 \text{ min.}$ Now put $x =$ the time past 9 o'clock; then, as the motions of the hands are as 12 to 1, we have, as $12 : 1 :: x : \frac{1}{12}x$ the space gone over by the hour hand in the time x ; therefore $15 - \frac{1}{12}x + x = 23$, which gives $x = 8\frac{8}{11}$ min. past 9. Or, secondly, by taking the supplement, it will be $15 - \frac{1}{12}x + x = 60 - 23 = 37$, which gives $x = 24$ min. past 9. Either of which values of x will answer the conditions of the question.

The same; by Mr. Henry Hunter, Alnwick.

Since the minute hand, in every revolution, makes at two different times the same angle with the hour hand, when the former is either going from or approaching to the latter, or, in other words, both before and after they are in opposition; and it not being mentioned in the question whether of the two it is, either of them may be taken; as follows:—Put $x =$ the num. of minutes, the minute hand was past 12; then will $\frac{1}{12}x =$ the min. the hour hand was past 9; and as $360^\circ : 60$, or $6 : 1 :: 138^\circ : 23$ min. the distance in time the two hands were asunder; therefore $15 - \frac{1}{12}x + x = 23$, and $x = 8\frac{8}{11}$ min. past 9 in the first case. Also $15 - \frac{1}{12}x + x = 60 - 23$, and $x = 24$ min. past 9, in the second case.

The same; by Mr. Wm. Middleton, Holland, near Wigan.

Let x denote the minutes past 9. Then $\frac{11}{12}x \times 6 = 138 - 90 = 48^\circ$, or its supplement 132° ; hence $x = \frac{576}{66}$ or $\frac{1584}{66}$, that is $8\frac{8}{11}$ or 24 minutes.

Nearly the same way was the answer given by Messrs. Ashcroft, A+B, Baker, Barlow, Bosworth, Burdon, Buttermann, Craggs, Driver, Ewbank, Francis, Furnass, Garratt, Gregory, Hartley, Hatfield, Haycock, Hefford, Henry, Hewitt, Latey, Laurent, Lockwood, Marriot, Mitchell, Ramsay, Rowbottom, Rowe, Scholfield, Scurr, Shields, Simpson, Squire, Smithson, Truman, Wade, Walker, Watkins, Wilson, Wooldridge, &c.

III. SUPP. QUEST. (87), answered; by Mr. W. Burdon, Acaster Malbis.

A construction of this problem is given at pa. 367 Simpson's Alg. and is to this effect; Having set off $AD = 50$, $AK = 70$,

No. 14. Supp. Questions answered. 35

make the angle $DAE = 37^\circ 50'$, and each of the angles ADE , AKG equal to $65^\circ 10'$; then with centres D , E , and radii 60 and AG , describe two arcs intersecting one another in H , and join AH . Apply $AP = 50$, $PC = 70$, and $PB = 60$, then ABC will be the triangular garden.

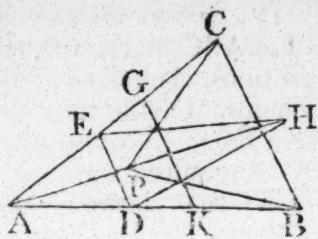
CALCULAT. In the triangle ADE are given, all the angles and the side AD , to find $DE = 30.8822$; and in the triangle AKG are given, all the angles and the side AK , to find $AG = 65.1983$ = EH . Then in the triangle DEH are given, all the sides, to find the angle $EDH = 85^\circ 19'$; and in the triangle ADH are given the sides AD , DH , and the included angle $ADH (= ADE + EDH)$, to find $AH = 106.35 = AB$. Hence then $BC = 71.87$, $AC = 114.18$, and the area of the triangle $ABC = 3724.0685$ square yards.

The same answered; by Mr. O. G. Gregory, Cambridge.

Let AMN be a triangle similar to that which is required, having the angles equal to the given one's, viz. $A = 65^\circ 10'$, $N = 37^\circ 50'$, and $M = 77^\circ$.—On AM set off AD , AF and AK , equal to 70, 60, and 50, respectively: then "draw DE and KG making the angles $\angle ADE$ and $\angle AKG$ each equal to the angle N , and intersecting AN in E and G ; from the centres D and E , with the intervals AF and AG , let two arcs be described, intersecting in H ; draw AH , in which take $AP = AD$; and from P , to AM and AN , apply PB and PC , equal respectively to AF and AK , and let B , C be joined; so shall ABC be the triangle that was to be determined." For the demonstr. see Simpson's Alg. as above.

CALCULAT. In the triangle ADE are given, all the angles and the side AD , from which are found $DE = 65.1983636$, and $AE = 44.065051$. Then, in the similar triangles ADE , AKG , as $AD : AE :: AK : AG = 31.4750365$. In the triangles DHE we then have all the sides, whence we get the angle $EDH = 28^\circ 44' 16''$, which added to $ADE = 37^\circ 50'$, gives $ADH = 66^\circ 34' 16''$; from whence and the given sides AD , DH including it, we discover $AH = AB = 71.841485$. Then by similar triangles $AE : AD :: AB : AC = 114.12453$; and $AE : DE :: AB : BC = 106.296188$. And lastly, $\frac{1}{2}AB \times AC \times .9075333$ (nat. sin. angle A) = 3720.37636475 square yards, the area of the garden as required.

Ingenious answers were also given by Miss Addison and Messrs. Blackwell, Buttermann, Craggs, Furnass, Hartley, Haycock, Henry, Hewitt, Hunter, Middleton, Mitchell, Ramsay, Rosebottom, Rowe, Scurr, Shields, Smithson, Truman, Watkins, Wilson, Wooldridge, &c.



IV. SUPP. QUEST. (88), answered; by Mr. W. Burden.

Let ABC be the triangle of the given dimensions, viz. $AB = a$, $AC = b$, and $BC = c$ chains. Divide the side AB in E, so that $AE : EB :: 3 : 5$, and draw CE, which will be the required walk.

CALCUL. Draw CD perp. to AB. Then, by theor. 37, Dr. Hutton's Geom. $AD = (\bar{AB}^2 + AC^2 - BC^2) \div 2AB = (a^2 + b^2 - c^2) \div 2a$; and by constr. $AE = \frac{3}{8}a$; then by the same theor. $CE = \sqrt{AE^2 + AC^2 - 2AE \cdot AD} = \frac{1}{8}\sqrt{40b^2 + 24c^2 - 15a^2}$.

The same answered; by Mr. T. S. Evans.

Let ABC be the triangle; and $AB = a$, $AC = b$, $BC = c$, also CE the walk. Then, by Eucl. 6, p. 1, $AE : ED :: 3 : 5$; and $\cos. \text{angle } B = \frac{a^2 + c^2 - b^2}{2ac}$; hence $CE =$

$$\sqrt{c^2 + \frac{25}{64}a^2 - \frac{5}{4}ac} \times \frac{a^2 + c^2 - b^2}{2ac} = \frac{1}{8}\sqrt{40b^2 + 24c^2 - 15a^2}.$$

The same, by Mr. Henry Hunter, Alnwick.

Let ABC be the given triangle. Make AE to EB as 3 to 5; draw OE, which will be the dividing line; and demit the perp. CD. Put $AB = a$, $AC = b$, and $BC = c$; then $a : b + c :: b - c : (b^2 - c^2) \div a = d$; hence $\frac{1}{2}a - \frac{1}{2}d = DB$, and $DE = EB - DB = \frac{1}{8}a + \frac{1}{2}d$; then $CD^2 = c^2 - (\frac{1}{2}a - \frac{1}{2}d)^2$, and $CE^2 = CD^2 + ED^2 = c^2 - (\frac{1}{2}a - \frac{1}{2}d)^2 + (\frac{1}{8}a + \frac{1}{2}d)^2 = (\text{by restoring the value of } D, \text{ &c.}) \frac{1}{64}(40b^2 + 24c^2 - 15a^2)$, conseq. $CE = \frac{1}{8}\sqrt{40b^2 + 24c^2 - 15a^2}$, as required.

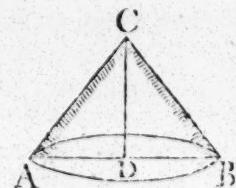
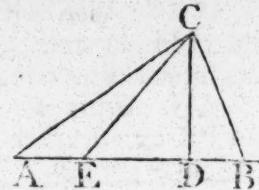
Other ingenious answers were also given by Miss Addison, and Messrs. Baker, Barlow, Blackwell, Butterman, Craggs, Furness, Gregory, Hartley, Haycock, Henry, Hewitt, Latey, Laurent, Lockwood, Marriot, Middleton, Mitchell, Ramsay, Rowbottom, Rowe, Scurr, Shields, Simpson, Smithson, Squire, Wade, Watkins, Wilson, Wooldridge, Wright, &c.

V. SUPP. QUEST. (89), ans. by Mr. W. Butterman, Dronfield.

First, $\sqrt{CD^2 + DB^2} = CB = \frac{1}{\sqrt{2}}\sqrt{89}$, and as $CB : CD :: 1 : .527 = f$ the force of gravity down CB. Then, by Hutton's Course of Math. vol. 2, pa. 152, we have $\sqrt{\frac{s}{gf}} = t = 17.092$ seconds, the time of descent; and $\frac{2s}{t} = v = 291.42$, the velocity at D or B.

The same answered; by Mr. T. S. Evans.

This quest. is similar to prob. 1, pa. 172, of Dr. Hutton's Practical Exercises, at the end of his Conic Sections. And by proceeding in the same manner (for there cannot be an easier) we obtain the force of gravity on the side of the mountain $= 5 \div \sqrt{89}$; also the last velocity $= 291.4133$ feet per second; and the whole time of descent $= 17.1$ seconds.



No. 14. Supp. Questions answered. 37

The same; by the Rev. J. Furness, Ponteland.

Let ABC be a vertical section of the mountain, in which CD = $\frac{1}{4}$ of a mile = 1320 feet = a , AD = $\frac{2}{5}$ of a mile = 2112 feet = b , $g = 16\frac{1}{2}$, v = the velocity, and t = the time; then AC = $\sqrt{a^2 + b^2} = 2490.57 = s$.—Now, by Dr. Hutton's Course of Math. vol. 2, prop. 23, pa. 166, $s : a :: 1$ (the force of gravity) : $a \div s = f$, the force on the plane, or side of the mountain AC. Then, by Dr. Hutton's Conics, theor. 6, pa. 169, $v = \sqrt{4gsf} = \sqrt{4 \times 16\frac{1}{2} \times 2490.57 \times 1320 \div 2490.57} = \sqrt{193 \times 440} = 291.4103$ feet, the last velocity per second; and by theor. 7 of the same, $t = \sqrt{\frac{s}{gf}} = \sqrt{\frac{2490.57 \times 2490.57}{16\frac{1}{2} \times 1320}} = \frac{2490.57}{4\frac{1}{2} \times 36\frac{1}{3}} = 17.1$ seconds, the time of descent.

The same; by Mr. J. Lockwood, Dronfield Academy.

If ABC represent the mountain; then we have given the perp. altitude CD = $\frac{1}{4}$ of a mile = 1320 feet, and DB = $\frac{2}{5}$ of a mile = 2112 feet, to find CB = $2490\frac{1}{2}$ feet nearly. Then, by pa. 172, Dr. Hutton's Practical Exercises, as $2490\frac{1}{2} : 1320 :: 1$ (the force of gravity) : $53 = f$, the force on the side CB; and $\sqrt{4gs} = \sqrt{4 \times 16\frac{1}{2} \times 53 \times 2490\frac{1}{2}} = 291.413$ feet, the velocity of the body at the bottom of the mountain; also $\sqrt{\frac{s}{gf}} = \sqrt{\frac{2490\frac{1}{2}}{16\frac{1}{2} \times 53}} = 17.092$ seconds, the time the body is descending down the side.

The same; by the Rev. Tho. Scurr, Hexham.

The perp. and slant height of the mountain being 1320 and 2490.57 feet respectively. Put v = the velocity, t = the time, $g = 16\frac{1}{2}$, $s = 2490.57$, and $p = 1320$; then, by mechanics, as $s : p :: 1 : p \div s = f$, the force on the plane. Theref. (by Dr. Hutton's Select Exercises, theor. 7, pa. 169) $t = \sqrt{s \div gf} = 17.0965$ seconds, the time of descending; and (by theor. 6 ibid.) $v = \sqrt{4gs} = 291.41$ feet, the last velocity per second.

The same; by Mr. John Smith, Alton Park.

The perp. height of the mountain being $\frac{1}{4}$ of a mile, 1320 feet, and the semidiam. of its base $\frac{2}{5}$ of a mile, or 2112 feet, the slant height is found (by Euel. I. 47.) to be 2490.571. Then, since the times of descent of falling bodies, are as the roots of the spaces, and $16\frac{1}{2}$ feet is the space fallen in the first second, it will be, as $\sqrt{16\frac{1}{2}} : \sqrt{1320} :: 1'' : 9.05939''$, the time in which a body would fall perpendicularly through the height of the mountain. And since the time of a body descending down an inclined plane, is to the time of falling through the perp. height, as the length of the plane is to the height, therefore, as $1320 : 2490.571 :: 9.05939'' : 17.0932''$, the time of descending down the side of the mountain. Again, since a body acquires the same velocity in descending down an inclined plane, as by falling perpendicularly through its height; and since the velocity of falling

bodies is as the root of the spaces descended, and $32\frac{1}{6}$ the velocity acquired by falling through $16\frac{1}{2}$ feet, it will be, as $\sqrt{16\frac{1}{2}} : \sqrt{1320} :: 32\frac{1}{6} : 291\cdot4102$ feet, the velocity per second.

Ingenious answers to this quest. were also given by Miss Addison, and Messrs. Baker, Blackwell, Bosworth, Burdon, Craggs, Francis, Garratt, Gregory, Hatfield, Haycock, Henry, Hewitt, Hunter, Laurent, Middleton, Mitchell, Ramsay, Roebottom, Rowe, Shields, Simpson, Smithson, Soyerby, Squire, Truman, Wade, Watkins, Wilson, Wright, &c.

VI. SUPP. QUEST. (90), ans. by Mr. Henry Hunter, Alnwick.

Suppose AEFB represent the pillar, AK parallel to the horizon, and AG perp. to the same, which, from the nature of the quest. will cut the axis CD in G the centre of gravity of the pillar. Put $a = AB$, $c = \cotang. \angle BAK$ or $\angle AGD$, $t = \cotang. \angle ABF$, and $x = CD$ or FH ; then, by trigon. as radius $1 : c :: \frac{1}{2}a : \frac{1}{2}ac = DG$, and as $1 : t :: x : tx = BH$; hence $AB - EF = 2BH = 2tx$; then, by Dr. Hutton's Math. Miscel. art. 12, the distance of the centre of gravity from the less end will come out

$$\frac{6a^2 - 8atx + 4t^2x^2}{3a^2 - 6atx + 4t^2x^2} \times \frac{1}{4}x = (CG = CD - DG) = x - \frac{1}{2}ac,$$

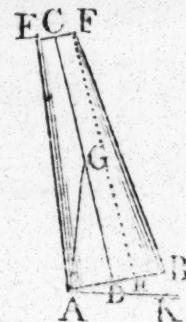
which reduced is $x^3 - \frac{4a + 2act}{3t}x^2 + \frac{a^2 + 2a^2ct}{2t^2}x = \frac{a^3c}{2t^2}$, or in numbers $x^3 - 85\cdot358575x^2 + 2418\cdot171x = 22434\cdot1828$; where $x = 21\cdot25$ feet, the height sought.

The same; by Mr. Wm. Middleton, Holland, near Wigan.

The pillar will be a conical frustum AEFB, whose slant side makes an angle of 85° with the diameter AB of its base, and the latter an angle of 20° with the horizontal line AK. Make AG perp. to AK, meeting the axis CD of the frustum in G its centre of gravity, the distance of which is thus found; as radius : AD (30) :: tan. $\angle A$ (70°) : DG ($= 82\cdot34$) :: sec. $\angle A$: AG $= 87\cdot71$. Now, put AB $= d$, EF $= x$; then the mean diameter is $\frac{1}{2}d + \frac{1}{2}x$, and (putting $t = \tan. 85^\circ$) as radius : $\frac{1}{2}d - \frac{1}{2}x :: t : \frac{1}{2}dt - \frac{1}{2}tx = CD$; then will $\frac{d^2 + 2(\frac{1}{2}d + \frac{1}{2}x)^2}{2d^2 + 2dx + 2x^2} \times (\frac{1}{2}dt - \frac{1}{2}tx) = \frac{1}{2}dt - \frac{1}{2}tx - DG =$ the distance of the centre of gravity from the less end of the frustum. From hence is found $x = 15\cdot574$, and then $\frac{1}{2}dt - \frac{1}{2}tx = 254$ nearly $= 21\cdot17$ feet $= CD$, the altitude as required.

The same; by the proposer, Mr. Wm. Burdon.

Let AK be a part of the horizon, and AB the bottom diam. of the frustum, making the angle BAK $= 20^\circ$; bisect AB with the perp. CD, and erect AE perp. to AK, meeting CD in G, which will be centre of gravity of the pillar, by art. 204, p. 191, vol. 2, Dr. Hutton's Course of Mathematics. By trigon. as radius : tang. $\angle DAG :: AD : DG = 82\cdot4243$. Put AB $= 60 = a$,



No. 14. Supp. Questions answered. 39

tang. $\angle ABF (85^\circ) = 11 \cdot 430052 = b$, and $BH = x$; then $FH = bx$, and $AB - EF = 2x$. Now, by art. 12, Hutton's Math.

Miscel. $\frac{6a^2 - 4ax + 2x + 4x^2}{3a^2 - 3ax + 2x + 4x^2} \times \frac{bx}{4} = bx = 82 \cdot 4243$. This put

into numbers, and reduced, gives $x^3 - 53 \cdot 7689536x^2 + 1599 \cdot 205824x - 15576 \cdot 17427$; hence is found $x = 15 \cdot 4735$ inches $= BH$; and then $FH = CD = 176 \cdot 86291$ inches $= 14 \cdot 73857$ feet, the perp. length of the pillar above the oblique plane.

* * * Note, by the Editor.

So great a difference appearing between the conclusions in the last answer, from the two former, and the labour of examining both the calculations in numbers, by the methods of reduction, and finding the root of the final cubic equations, as used above, on account of the size and the quantity of the numbers, appearing to be terrifyingly great; this appeared to be a good opportunity of shewing the excellence of the method of resolving such equations by the rule of Double Position, as recommended in Dr. Hutton's Math. vol. 1, pa. 248, as the root is very soon found by that method, and as the previous troublesome reduction is saved. Thus, the equation in the last of the foregoing solutions, put into

numbers, becomes $\frac{5400 - 240x + 3x^2}{2700 - 90x + x^2} \times x = \frac{120 \times \text{tang. } 70^\circ}{\text{tang. } 85^\circ}$

$= 28 \cdot 8448$. Then, without reducing it to a final cubic as above, by two or three short trials, it soon appears that the value of x is between 22 and 23, for by substituting 22 for x , the unknown side easily comes out $= 28 \cdot 7243$, instead of 28.8448, and by using 23 for x , that side is $= 29 \cdot 1122$ instead of 28.8448; then dividing the least error .1205 by the sum of the errors .3879, gives .311 for the correction of the least assumed number 22, and consequently the true value of x is 22.311. Then this multiplied by b or 11.430052, gives $bx = FH$ or $CD = 255 \cdot 0158$ inches $= 21 \cdot 2513$ feet, for the length of the solid required. EDITOR.

Ingenious solutions to this question were also given by Messrs. Blackwell, Bosworth, Craggs, Evans, Garratt, Gregory, Haycock, Lockwood, Mitchell, Rowbottom, Rowe, Shields, Smithson, Watkins, and Wright: beside others who attempted the solution by erroneous methods; as, when they either considered the solid as a cylinder, instead of a conic frustum, and as when they made the solid content on both sides of the vertical line or plane AG equal to each other.

VII. SUPP. QUEST. (91), answered; by Mr. T. S. Evans.

The altitude, being equal to half the coaltitude, must be 30° ; and cos. lat. \times tang. alt. $=$ cot. time from noon $= 4h. 41m. 31sec.$; also sin. alt. \times sin. lat $=$ sin. decl. $23^\circ 9' 30''$, answering to June 11 or 31st.—Now alt. $30^\circ +$ sun's semidiam. $15' 48'' +$ refract. $1' 38''$ —parallax $7'' = 30^\circ 17' 19''$ the apparent alt. of the sun's upper limb; the tang. of which $\times 123 \cdot 2722$ gives 72 feet, for the height of the tower.

The same; by Mr. David Henry, Stamford.

As the altitude is half its complement, it must be 30° . There-

fore, in a right-angled spherical triangle ABC, there are given, the alt. or hypothenuse AC = 30° , and the lat. or angle BAC = $51^\circ 52'$, to find the opp. side or perp. BC = $23^\circ 9' 33''$ the declin. answering nearest to the 11th of June.—Then adding $17' 30''$ (for semidiameter and refraction) to the true alt. gives $30^\circ 17' 30''$ for the apparent alt. of sun's upper limb; with which, and the given length of the shadow, by trigon. the tower's height is found = $72\cdot01$ feet.

The same; by Mr. Wm. Middleton.

As the sun's coalt. was double his altitude, the latter was 30° ; and if we add semidiameter and refraction, we shall have $30^\circ 18'$ for the inclination of a ray from the sun's upper limb; therefore as radius : $123\cdot2722 :: \text{tang. } 30^\circ 18' : 72$ feet, nearly the tower's height. Then, in a right-angled triangle, there are given the two legs, viz. the colat. $38^\circ 8'$, and the coalt. 60° , to find the hypothenuse or codeclin. = $66^\circ 50'$, whose compl. is $23^\circ 10'$, and the angle from noon = $70^\circ 23'$. Hence the time was June 12th or 30th, at $4\text{h. } 41\frac{8}{15}\text{ min. afternoon.}$

The same; by Mr. John Mitchell, Pleasington School.

In a right-angled spherical triangle SZP (S being the place of the sun, Z the zenith, and P the pole) there are given, the colat. ZP = $38^\circ 8'$, and the coalt. ZS = 60° , to find the hypoth. SP = $66^\circ 50' 27''$ the codeclin. hence the sun's declination is $23^\circ 9' 33''$, and the angle P is found = $70^\circ 22' 42''$ the hour angle from noon; which turned into time gives $4\text{h. } 41\text{m. } 30\text{s.}$ Hence the time is June 11th, $4\text{h. } 41\text{m. } 30\text{s. past noon.}$ —Again, by allowing for the sun's semidiameter, refraction and parallax, the altitude of the sun's upper limb will be $30^\circ 17' 18''$; then, in a right-angled plane triangle ABC, there are given, the angle A = $30^\circ 17' 18''$, and the side AB = $123\cdot2722$ feet, the length of the shadow; from which is found the perp. BC = $72\cdot0008$ feet, the height of the tower.

Other ingenious solutions were also given by Messrs. Blackwell, Burdon, Craggs, Ewbank, Francis, Furnass, Garratt, Gregory, Haycock, Hefford, Hewitt, Rees, Rosebottom, Rowe, Scurr, Shields, Simpson, Smithson, Truman, Watkins, Wilson, Wright, &c.

VIII. OR SUPP. PRIZE QUEST. (92), ANSWERED; BY THE PROPOSER, MR. O. G. GREGORY, TEACHER OF MATHEMATICS, CAMBRIDGE.

It has been proved, (in Cotes's Lect. 3, and also easily appears from Hutton's Mathem. vol. 2, art. 222 and 267,) the pressure upon any surface whatever, however it be situated, is equal to the weight of a body of water, whose magnitude is found by multiplying the surface proposed into the depth of its centre of gravity under water. Now to estimate the whole pressure on the pyramidal vessel when full, let AEB, in the figure annexed,

No. 14. Supp. Questions answered. 41

represent a vertical section of the pyramid, of which section the base $A\bar{E}$ is parallel to one of the sides of the base of the pyramid, and passes through C the centre of that base: then will AB represent the perpendicular of one of the triangular sides of the pyramid; and the centre of gravity G of this triangle, is so situated, as to make $AG : GB :: 1 : 2$. As CB is given = 4, and $AB : AG :: CB : DG$, we readily find $DG = \frac{1}{3}$ of 4 = $1\frac{1}{3}$, the depth of the centre of gravity below the surface of the water; and as the area of each side is known to be $AB \times AC = 5 \times 3$, we shall have $1\frac{1}{3} \times 5 \times 3 \times 4$ (the number of sides of the pyramid) = 80, for the quantity of water in cubic feet, the weight of which (5000lb. averd.) is equivalent to the whole pressure on the internal surface of the pyramid when full.

To determine what quantity of water must be taken out, so that the pressure of the remainder on the surface which it covers, shall be one 8th of the pressure just ascertained: let aF represent the surface of the water when the proper quantity is taken out, g the centre of gravity of the triangle of which aB is the perpendicular, and consequently gd the distance of this centre of gravity below the surface aF . Now as $AB^2 : aB^2 ::$ the area of the triangle of which AB is a perpendicular: the area of the triangle of which aB is a perpendicular. And, as $AB : aB :: GD : gd$, as may be easily proved. Hence, by incorporating these proportions, we get $AB^3 : aB^3 ::$ pressure on the triangle of which AB is a perpendicular : pressure on the triangle of which aB is a perpendicular:—that is, the pressures on similar surfaces, similarly situated, are proportional to the cubes of similar dimensions. But it is known that the contents of solids are proportional to the cubes of like dimensions; therefore in similar vessels in similar positions, the pressures of liquors on their surfaces will be proportional to the quantities of liquor. Hence, in the present instance $\frac{7}{8}$ ths of the content of the vessel (that is, $\frac{7}{8}$ ths of $298\frac{18}{144}$ ale gallons) must be taken away, and then the pressure of the remainder will be equal to 625lb, or $\frac{1}{8}$ of the whole pressure before ascertained.

The same answered; by the Rev. L. Evans.

As the pressure of the fluid acts perpendicularly against every particle of the internal superficies, though at unequal depths, the sum of all the pressures against it, will be equal to the whole surface drawn into the perpendicular depth of the centre of gravity of each triangular side below the surface of the water; as will appear from Dr. Hutton's Course, vol. ii. prop. 41 and 52. And since that centre is at $\frac{1}{3}$ of the perp. depth of the vessel = $\frac{4}{3}$, and the area of each of the four sides is $= 3 \times 5 = 15$, or of all the four = 60; therefore $60 \times \frac{4}{3} = 80$ cubic feet, is equal to the whole pressure, which, at $62\frac{1}{2}$ lb. each foot, amounts to

5000lb. weight, for the whole pressure.—Also, by similarity of solids, $\frac{7}{8}$ of the water must be taken out, or $\frac{1}{8}$ of it only left in it, that so the pressure may be $\frac{1}{8}$ of the whole pressure.

The same; by Mr. Wm. Middleton, Holland.

The area, or internal superficies of one side of the pyramid, is $3 \times \sqrt{3^2 + 4^2} = 3 \times 5 = 15$ square feet; and the distance of its centre of gravity below the surface, is $\frac{4}{3}$; theref. $15 \times 4 \times \frac{4}{3} \times 62\frac{1}{2} = 5000$ pounds, the pressure on the four sides, or whole internal superficies; the 8th part of which is 625lb. Now put $x =$ depth of water when the pressure is the 8th part of the whole, or 625lb; then $\frac{3}{4}x \times \frac{5}{4}x \times \frac{1}{3}x \times 4 \times 62\frac{1}{2} = 625$; hence $x = \sqrt[3]{8} = 2$ feet, the depth; and the water to be taken out will be $6^2 \times \frac{4}{3} - 3^2 \times \frac{2}{3} = 48 - 6 = 42$ cubic feet.

The same; by Mr. Tho. Swaineck, Derby.

First, $\sqrt{3^2 + 5^2} = 5$ feet, the perp. of one of the triangular sides. Then, by Hydrostatics, the superficies of any plane being multiplied by the perp. depth of its centre of gravity, gives the quantity of pressure on that superficies. Now, in a triangle, the centre of gravity is at $\frac{1}{3}$ of the altitude from the base, that is $\frac{1}{3}$ of 4 = $\frac{4}{3}$. Theref. $3 \times 5 \times 4 = 60$ feet is the whole superficies; and $60 \times \frac{4}{3} \times 62\frac{1}{2} = 5000$ lb. the whole pressure.—Again, because the quantity is required which will cause a pressure equal to $\frac{1}{8}$ of the above; and also because the dimensions of similar solids are as the cube roots of their contents; theref. $\sqrt[3]{\frac{1}{8}} = \frac{1}{2}$, and then $\frac{1}{2}$ of 4 = 2 feet, is the height to which it must be filled; the base at this height is = 3, and $3 \times 3 \times \frac{2}{3} = 6$ cubic feet, which will cause $\frac{1}{8}$ of the pressure.

Other ingenious solutions to this curious question were also given by Messrs. Blackwell, Bosworth, Burdon, Craggs, Crosby, T. S. Evans, Ewbank, Francis, Furnass, Garratt, Haycock, Henry, Hewitt, Hornby, Laurent, Marriot, Rain, Rees, Rowbottom, Rowe, Smithson, Surtees, Walton, Watkins, Wooldridge, &c.

DIARY QUESTIONS ANSWERED.

I. DIARY QUEST. answered; by the Rev. L. Evans.

Let $x =$ sine of the required arc; then its cos. will be $\sqrt{1 - x^2}$, and tang. $3x$; but, by trigon. as $\sqrt{1 - x^2} : x :: 1 : 3x$; hence $3\sqrt{1 - x^2} = 1$, and $x = \frac{2}{3}\sqrt{2} = .9428091$ the nat. sine of $70^\circ 31' 43.7''$; then $360^\circ : 62.831853 :: 70^\circ 31' 43.7'' : 12.3096$, the length of the arc sought.

The same; by Mr. T. S. Evans.

Put $x =$ sine; then $x \div \sqrt{1 - x^2} =$ tang. and, by the quest. $3x = x \div \sqrt{1 - x^2}$, or $3\sqrt{1 - x^2} = 1$, and $x = \frac{2}{3}\sqrt{2} =$ sin. $70^\circ 31' 43.6''$ or 70.52878° ; then $70.52878^\circ \times 10 \div 57.29578 = 12.3096$ the answer.

No. 14. Diary Questions answered. 43

The same; by Mr. Wm. Walker, at Mr. Leeming's Academy, Horseforth, near Leeds.

By trigon. and sim. triangles, as $3:1::1:\frac{1}{3}$, the sine of $19^\circ 28'$, the comp. of which, $70^\circ 32'$, is the measure in degrees of the required arc; and $10 \times 3.1416 = 31.416$ is the length of the semi-circumf. or 180° ; theref. as $180^\circ : 31.416 :: 70^\circ 32' : 12.31$ nearly, the length of the arc required.

The same; by Miss Eliza Wright, Flaxton.

Put $x =$ the sine; then $\sqrt{1-x^2}$ is the cosine, and $3x$ the tang. then by sim. tri. as $\sqrt{1-x^2}:x::1:3x$; hence $x = \frac{2}{3}\sqrt{2} = 94280904$, the nat. sine of $70^\circ 31' 43'' 50'''$. Then, by Dr. Hutton's Tables, the length of the arc, to radius 10, is found = 12.309605.

IV. DIARY QUEST. answered; by Mr. T. S. Evans.

Let $n^2 + 13 = r^2$; then $n^2 = r^2 - 13$, and $n^2 - 13 = r^2 - 26$, which is also to be a square number. Let its root be = $r - s$; then $r^2 - 26 = r^2 - 2rs + s^2$, conseq. $2rs = s^2 + 26$, and $r = \frac{s^2 + 26}{2s}$, hence $n = \frac{s^2}{4} + \frac{169}{s^2}$. If $s = 1$; then $n^2 = 169\frac{1}{4}$, also $n^2 + 13$ and $n^2 - 13 = 182\frac{1}{4}$ and $156\frac{1}{4}$, both rational squares.

The same; by Mr. John Haycock, Stanstead School.

Put $x^2 - 13 = n^2 = y^2 + 13$; then $x^2 - y^2 = 26 = 13 \times 2$. Hence, proceeding according to Leybourn's Repos. vol. 1, art. 22, pa. 155, &c. we have $x = \frac{13m^2 + 2}{2m}$, and $y = \frac{13m^2 - 2}{2m}$; then (taking $m = 1$) $n^2 = \frac{173}{4}$.

The same; by the Rev. Tho. Scurr, Hexham.

Put $n^2 + 13 = y^2$, and $n^2 - 13 =$ a square by the quest. Hence $n^2 = y^2 - 13$, and $y^2 - 26$ a square. Assume the side of this square = $r - y$; then will $y^2 - 26 = (r - y)^2 = r^2 - 2ry + y^2$; hence $y = \frac{r^2 + 26}{2r}$. So that, if r be taken = 2, we shall have $y = 7\frac{1}{2}$; then $n^2 + 13 = y^2 = 56\frac{1}{4}$, and $n = \sqrt{43\frac{1}{4}}$.

VI. DIARY QUEST. ans. by Mr. John Ryley.

It is evident that two lines from the vertex of the triangle, so as to cut off a given part from the inscribed circle, either of which will answer the conditions of the question, i.e. CD or Cd (first fig. to the Diary solut.). Now as the sides of the triangle ABC are given, the area is easily found by a common rule = $4\sqrt{5} = \sqrt{80} = 8.944272$ square chains; which divided by half the sum of the sides, gives the radius of the inscribed circle OE or OG = $\frac{1}{2}\sqrt{5}$; and $\frac{1}{2}(AB + BC - AC) = BG = 1$; hence, by Eucl. 47, 1, BO = $1\frac{1}{2}$. Theref. the area of the circle = 3.927, the 4th of which = .98175 is the area of the segment EF or HI; which being divided by 5, the square of the diameter,

gives .19635 the corresponding tabular area, whose versed sine is .298. Theref. as $1 : .298 :: \sqrt{5} : .666348 = EF$ or HI ; hence $OF = OH = .451686$. Again, in the right-angled triangle OBG , all the sides are given, to find the angle $OBG = OBC = 48^\circ 11' 23''$; also, in the identical right-angled triangles OBF , OBH , two sides are given, to find the equal angles OBF and $OBH = 17^\circ 31' 31''$; hence the angle $DBA = CBd = 65^\circ 42' 54''$, and $ABd = CBD = 30^\circ 39' 52''$.—Also, in the triangle ABC , all the sides and the angle ABC are given, to find the angle $A = 58^\circ 24' 42''$; hence the angle $AdB = 90^\circ 55' 26''$, and $ADB = 55^\circ 52' 24''$. Now, in the triangles ABd , ABD , all the angles and the side AB are given, to find $Bd = 2.555833$, and $BD = 3.0871$ chains. Theref. $\frac{1}{2} AB \times Bd \times \sin. \angle Abd = 1.955247$, and $\frac{1}{2} AB \times BD \times \sin. \angle ABD = 4.220888$ square chains, the areas of the triangles ABd , ABD ; which being each taken from the area of the whole triangle ABC , there remains the areas of the triangles Cbd , CBD , $= 6.989025$ and 4.723384 square chains.

VIII. DIARY QUEST. *ans. by Mr. J. Hefford, Assistant in Taylor and Butterman's Academy, Dronfield.*

In the Diary for 1797 it was shewn that a person whose height was $5\frac{1}{2}$ feet, could see 16692 $\frac{3}{4}$ acres of surface, without moving from his station. Now, to this there only remains to be added the curve surface of the segment of a zone, the height of which is easily found $= 460\frac{2}{3}$ chains. And by Dr. Hutton's Mensur. or his new Course, $460\frac{2}{3} \times 100$ miles or 8000 chains $= 3685280$ chains, the convex surface of the zone's segment; which added to the surface of the above seg. and divided by 10, gives 385220 $\frac{3}{4}$, the number of acres required.

X. DIARY QUEST. *ans. by Mr. Jos. Wilson, Black Callerton.*

Put $2x$ = the length, and x the breadth of the rectangle. Then is $2x \times x = 2x^2 = 112.5$, or $x = 7.5$, and $2x = 15$; also $\sqrt{7.5^2 + 15^2} = 16.7705$ the length of the shadow. Then we have given the length of the shadow, and the height of the wall, to find the sun's height $= 12^\circ 52'$. Also, the angle of the diagonal and side $= 26^\circ 33'$, to which add 15° , gives $41^\circ 33'$ the azimuth from east. Then we have given the colat.: and the coalt. and the angle of azimuth, to find the declin. $= 12^\circ 12'$, answering to Feb. 16, and hour angle $48^\circ 27'$, answering to 3h. 13m. which taken from 12, gives 8h. 47m. in the morning, the time of obser.

XI. DIARY QUEST. *ans. by Mr. Wm. Watts, Plymouth.*

Since the ball, in falling from an infinite height, has acquired a uniform velocity, it must therefore be incapable of further acceleration, and consequently the velocity of the ball is arrived at such a degree that the resisting force is equal to the weight that urges it. Now put d = the diam. of the ball, $p = 3.1416$, $\frac{1}{6}pd^3 = 16\frac{1}{12}$, v = the velocity, also N and n the separate specific gravities of the ball and air; then $N - n$ will be the relative gravity of the ball in air, theref. $\frac{1}{6}pd^3(N - n)$ is the weight by

No. 14. Diary Questions answered. 45

which it is urged, and the resistance is $\frac{pnv^2d^2}{32g}$; conseq. $\frac{pnv^2d^2}{32g} = \frac{1}{6}pd^3(N-n)$ when the velocity becomes uniform; see Dr. Hutton's Select Exercises, prob. 30; hence

$$d = 4g \cdot \frac{N-n}{3} \cdot \frac{9nv^2}{4g(N-n)} = \frac{3}{2500} \text{ of an inch, the diam.}$$

Had the velocity been 10 times as much, or 72·85 instead of 285, the diam. would be 100 times as much, or $\frac{3}{25}$ of an inch; and if the velocity were 728·5, the diam. would be 12 inches; and so on according to the square of the velocity.

XII. DIARY QUEST. ans. by Mr. Wm. Middleton, Holland.

Given the lat. of the place $54^\circ 32'$ north, the sun's declin. $= 10'$, and his horary distance from the meridian $= 45^\circ$; to find the apparent alt. of the sun's upper limb $= 31^\circ 5' = \angle CGD$ (*fig. in the Diary*), whose tang. put $= t$, $CD = AD = x$; then

$$OG = \frac{x}{t}, AG = \frac{x}{t} - x, DH = tx, AH = x - tx, EH =$$

$$\sqrt{x^2 - t^2x^2} = x\sqrt{1-t^2}, \text{ and } EH \times GH =$$

$$(\frac{x}{t} - tx) \sqrt{x^2 - t^2x^2} = \frac{x^2 - t^2x^2}{t} \sqrt{1-t^2} = \text{area FGE};$$

also, by Mensur. the segment EAF $= \frac{4}{3}x^2 \sqrt{2-2t^2} -$

$$x^2 + tx^2) \sqrt{1-t^2}; \text{ theref. area GEAF} = (\frac{x^2}{t} + \frac{x^2}{3}) \sqrt{1-t^2}$$

$$-\frac{4}{3}x^2 \sqrt{2-2t^2} = 8 \text{ square feet; hence } x =$$

$$24t$$

$$\frac{(3+t)\sqrt{1-t^2} - 4\sqrt{2-2t^2}}{24t} = 4.44643, \text{ and hence the}$$

solidity of the cone $= 92.058$ cubic feet.

XIII. DIARY QUEST. ans. by Mr. W. P. Clary Cowper.

When the polygon turns round its greatest or central diagonal F, it is evident that the whole solid will be composed of the cylinder ACEG and the two cones ABC, EFG [*fig. in the Diary*]; theref. putting $p = 3.1416$, the whole superficies is $(AD \times DH + AD \times \frac{1}{2}AB + GH \times \frac{1}{2}GF) \times p$; but, by the nature of the polygon, $\frac{1}{2}AB = BD$, and $\frac{1}{2}GF = FH$; theref. $AD \times BF \times p$ the whole superficies.

The same; by Mr. J. Lockwood, Dronfield Academy.

The solid formed by the rotation of the hexagon will evidently be composed of a cylinder, and two equal cones abutting on and coinciding with the ends of the cylinder. For let ABC $\bar{E}FG$ be the hexagon, and BF the axis about which the rotation is made, [*fig. in the Diary*]; then ACEG is the cylinder, ABC is one cone, and EFG the other. Now as the area is given $= 72$ feet, the side easily found $= 5.26429 = AB$ or AG ; hence $AD = 4.559$; theref. $2AD \times AG \times 3.1416 = 150.79611348 =$ convex surface of the cylinder, and $AD \times AB(AG) \times 3.1416 = 75.3980567$,

which multiplied by 2, gives $150\cdot79611348$ = convex surface of both cones; which added to that of the cylinder, gives $30\cdot59222696$ = whole surface of the solid generated. Also $AC^2 \times AG \times .7854 = 343\cdot7545362$ = solidity of the cylinder; and $AC^2 \times \frac{1}{3}BD \times .7854 = 57\cdot2924227$, which doubled gives $11\cdot584854$ = solidity of both cones; to this add that of the cylinder, gives $458\cdot3393816$ = solidity of the whole generated solid.

The same; by Mr. Isaac Rosebottom, West Hallam.

Let ABCEG be the hexagon, and BF the diagonal, about which the polygon revolves, [fig. in the Diary.] Then the side AB = $4\sqrt[4]{3}$, AC = $4\sqrt[4]{27}$, and BD = $2\sqrt[4]{3}$; hence $3\cdot1416 \times 4\sqrt[4]{27} \times 4\sqrt[4]{3} = 3\cdot1416 \times 48$ = that of the cylinder ACEG; theref. $3\cdot1416 \times 96 = 301\cdot5936$ is the whole superficies. Again, $3\cdot1416 \times 4\sqrt[4]{27} \times 4\sqrt[4]{3} = 3\cdot1416 \times 16\sqrt[4]{27}$ the solidity of the two cones, and $3\cdot1416 \times 4\sqrt[4]{27} \times 4\sqrt[4]{3} = 3\cdot1416 \times 48\sqrt[4]{27}$ that of the cylinder; theref. $3\cdot1416 \times 64\sqrt[4]{27} = 458\cdot32174$ is the whole solidity.

SCHOL. If the polygon were to revolve round IK the central distance of two of its parallel sides; then $3\cdot1416 \times (96\sqrt[4]{3} - 8\sqrt{3}) = 440\cdot45078$ would be the whole superficies, and $3\cdot1416 \times 112\sqrt[4]{3} = 463\cdot0727$ the whole solidity. After the manner of the above solution may the superficies and solidity of any regular polygon be found. For, when the polygon has an even number of sides, and revolves round its greatest diagonal; the middle solid will always be a cylinder, the two endmost cones, and the intermediates frustums of cones: but when the polygon has an odd number of sides; then the solid at one end will be a cone, and the others frustums of cones.

XIV. DIARY QUEST. ans. by Mr. O. G. Gregory, Cambridge.

The sine of 18° may be determined, not only without a cubic but without a quadratic, by the following method.—From Emerson's Geom. book 4, pr. 44, it appears, that if r be the radius of a circle, the side of an inscribed regular pentagon will be equal to $r\sqrt{\frac{5}{2}} - \frac{1}{2}\sqrt{5}$, which is evidently equal to the chord of 72° ; and the half of this, namely $\frac{1}{2}r\sqrt{\frac{5}{2}} - \frac{1}{4}\sqrt{5}$ denotes the sine of 36° . But, if s be put for the sine of 18° ; then, by cor. 1 to pr. 4. Emerson's Trigon. $\sqrt{\frac{1}{2}r^2 - \frac{1}{2}rs}$ denotes also the sine of 36° : theref. $\frac{1}{2}r\sqrt{\frac{5}{2}} - \frac{1}{4}\sqrt{5} = \sqrt{\frac{1}{2}r^2 - \frac{1}{2}rs}$; by involu. and mult. by 2, gives $\frac{1}{4}r^2(5 - \sqrt{5}) = r^2 - rs$; hence, by transposing and dividing by r , we get $s = r - \frac{5}{4}r + \frac{1}{4}r\sqrt{5} = \frac{1}{4}r\sqrt{5} - \frac{1}{4}r(\sqrt{5} - 1)$ the sine of 18° .

The same; by Mr. Thos. Hornby, Land Surveyor, Wombleton.

It is a well known property, that the chord of any arc is equal to double the sine of half that arc: theref. let x = the chord of 36° , or the side of a regular decagon inscribed in a circle whose radius is r . Then, by the rule at pa. 238, vol. 1, Dr. Hutton's Dictionary, under the art. Decagon, if radius be divided in me-

and extreme proportion, the greater segment is equal to the side
of the decagon; hence $r - x : x :: x : r$; then $r^2 - rx = x^2$, and
hence $x = \frac{1}{2}\sqrt{4r^2 + r^2 - \frac{1}{2}r} = \frac{1}{2}r\sqrt{5 - \frac{1}{2}r}$; theref. $\frac{1}{2}x = \frac{1}{4}r(\sqrt{5 - 1})$ the sine of 18° , as required.

The same; by Mr. Henry Hunter, Alnwick.

Let r = radius, s = sine of 18° ; then, in the book referred to by the proposer, $8s^3 + 8s^2r - r^3 = 0$; this divided by $2s + r$, gives $4s^2 + 2rs - r^2 = 0$, a quadratic equation, whence is found $s = \frac{1}{4}r(\sqrt{5 - 1})$.

The same; by Mr. Wm. Watkins, Prudhoe.

The original equation is $8s^3 + 8rs^2 - r^3 = 0$. Now put $y = s - \frac{1}{4}r$; then

$$\begin{aligned} 8s^3 &= 8y^3 - 12ry^2 + 6r^2y - r^3 \quad \text{their sum } 8y^3 - 4ry^2 - \\ 8s^2r &= + 8ry^2 - 8r^2y + 2r^3 \quad 2r^2y = 0; \text{ dividing by } 8y \\ - r^3 &= - r^3 \quad \text{gives } y^2 - \frac{1}{2}ry = \frac{1}{4}r^2 \text{ a} \\ \text{quadratic equation; whence } y &= \frac{1}{4}r\sqrt{5} + \frac{1}{4}r, \text{ and theref. } s, \\ \text{or } y - \frac{1}{2}r, &\text{ is } \frac{1}{4}r\sqrt{5} - \frac{1}{4}r = \frac{1}{4}r(\sqrt{5 - 1}), \text{ as required.} \end{aligned}$$

NEW QUESTIONS.

I. QUEST. (93), by Mr. John Blackwell, Hungerford.

How many yards, is it possible to strike off, with one extremity of a Gunter's chain, from a circular bowling green, of 48 yards diameter, when the other end of the chain is fixed at $14\frac{1}{2}$ yards without the circumference?

II. QUEST. (94), by Mr. Tho. Coultherd.

It is now 50 years, allowing 365 days 6 hours to a year, since old Jacob and his wife first began to smoke a pipe of tobacco together, an amusement in which they have constantly consumed 18d. per week between them. Now their portions of that sum is thus adjusted, namely, that for every 2 pipes smoked by Jacob, his wife always finished 3, but then 4 of them took up as much tobacco to charge them as 5 of her's. Now supposing this 18 pence had been put out every week, and to have born weekly interest, after the rate of 5 per cent. per annum, $\frac{5}{52}$ per week, compound interest; I desire to know what would have been its present amount, and the share of each, admitting cor. to have been divided in proportion to the above consumption?

III. QUEST. (95), by Miss Eliza Wright, Flaxton.

At Flaxton there are two regular fields, of equal area, the one triangular and the other triangular: now the former takes 72 yards less fencing than the other. Query their areas?

IV. QUEST. (96), by Mr. Alex. Rose, Reginnis.

Of four numbers in arithmetical progression, the sum of the squares of the two means is 2405, and the difference of the squares of the two extremes 1449. Hence those numbers are required?

V. QUEST. (97), by Mr. Isaac Rowbottom, West Hallam.

At a certain point in the ground floor of the Free School at

West Hallam, and $1\frac{1}{2}$ feet from the centre of the floor, is a cast metal pillar, in a right line with the centre and a stove grate at the end of the room. Now the effects of heat from the stove, to the centre and pillar, are as 5 to $4\frac{29}{25}$; and if from two points on the floor two right lines be drawn, their sum being equal to the length of the room, they shall always intersect each other in the greatest inscribed curve; also the nearest distance from the pillar to the said curve is $\frac{42}{25}\sqrt{21}$ feet. Required the dimensions of the rectangular room?

VI. QUEST. (98), by Mr. Tho. Squire, Baldock.

Supposing the earth a perfect sphere, to what height must I ascend vertically over the town of Baldock*, so as just to see the cross on the top of St. Peter's at Rome†, the altitude of which (above the horizontal pavement) is said to be 450 feet; supposing the eye to meet with no obstruction but from the earth's convexity, and the length of a degree on the parallel of the former place equal to $42\frac{3}{4}$ miles.

* Lat. $52^{\circ} 2'$, and l. $5'$ west. † Lat. $41^{\circ} 54'$, and l. $12^{\circ} 55'$ east.

* * * The Editor expresses his sorrow that Mr. Squire's letter was mislaid, and not discovered till after the solutions to all the questions had been inserted, otherwise their merit would have entitled some of his solutions to a place in the Diary.

VII. QUEST. (99), by Mr. Wm. Walker, Horsforth.

Required the thickness of a shell of gold, in the form of a spheroid, that will just float in the air; the transverse and conjugate exterior diameters being 24 and 16 inches, also the specific gravities of gold and air being 19640 and $1\frac{2}{3}$.

VIII. or PRIZE QUEST. (100), by Mr. W. P. Clary Coepper.
(Whoever ans. it before Feb. 2, has a chance by lot for 6 Supps.)

I would know the length of a pendulum, which vibrates as often in a minute as its length contains inches; as also the time in which the same would describe a conical surface, whose height is equal to half the length of the pendulum.

* * * **ERRAT.** in last Sup. pa. 39 l. 22, for $AB=120$, read $CB=120$.

The communications of Mr. Wm. Saint, whose omission is complained of, never came to hand. **FE 69**

* * * It has been found more agreeable to the contributors to the Supplement, to make some alteration in the allotment of prizes; viz. to give always four lots of prizes, 6 Supplements for the solution of the Prize Enigma, 6 for the General Answers of the Enigmas, 6 for the Rebuses, Charades, and Queries, and 6 for the Prize Question. This year, the said prizes have fallen, by lot, to the following persons, viz. to Mr. O. G. Gregory, 6 Supplements for the Prize Question; to Miss A. W. Maken 6, for the Prize Enigma; to Mrs. Richardson 6, for the Enigmas; and to Mr. John Ashcroft 6, for the Rebuses, Charades, and Queries; all of whom will please to send some person in London, to call for them at Mr. Robinson's, in Paternoster-Row.

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